Remote Monitoring of Lift Stations

GPS Data Acquisition

Combined Sewer Overflow Operational Plan

Lateral Repair for I&I Reduction

SANITARY DISTRICT OF MICHIGAN CITY

Revision 3.2009
(February 2009)

Education & Outreach

Board of Commissioners

Administrative Director Doretha Sanders

Sanitary District of Michigan City

Combined Sewer Overflow Operational Plan
Revision 3.2009

February 2009

SANITARY DISTRICT OF MICHIGAN CITY

Report Format

The preparation of the revised Combined Sewer Overflow Operational Plan was a combined effort of Plant Department staff and Collection Systems staff of the Sanitary District of Michigan City. The format utilized for this update was developed to facilitate future annual updates. The text of the report contains both historical perspectives that provide contextual continuity, and summaries of current operational practices that may change somewhat from year-to-year as new procedures may be employed.

Additionally, many of the Appendices contain data and information that will need to be updated regularly. Thus, new data can be added easily by removing the outdated appendix sheets and inserting the new data.

As the new format does not directly correlate to the report format of 1996, we have included in Appendix A a tool that provides a word-by-word comparison that utilizes the 1996 report format and identifies deleted text and proposed new text and data.

Respectfully submitted,

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February 9, 2009

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List of Revisions to Made to CSSOP for 2008 Submittal

General Format Revisions:

- All annual revisions to the CSOOP will be named Revision 3.xxxx, where xxxx is the year of submittal.

- The 3.2009 version of the CSOOP was expanded to permit annual replacement of pages.

Specific Content Revisions: The following sections/charts/tables were updated for the CSOOP submittal (REVISION 3.2009):

- Page 11 of 69, Table 2-1 renamed Table 2-1a

- Page 12 of 69, new paragraph added at top of page summarizing 2008 activities; new Table 2-1b added

- Page 13 of 69, Section 2.2.3, amount spent revised from $101,013,391 to $101,649,991; and, next to last sentence, changed "8.81 MGD" to "9.73 MGD for 2008".

- Page 15 of 69, Section 2.3, first sentence, was changed from "2000 through 2007" to "2000 through 2008".

- Page 15 of 69, Table 2-2, was updated for 2008

- Page 15 of 69, Section 2.3, second paragraph, next to last sentence, was changed from "2006 and 2007" to 2006 through 2008"

- Pages 17-18 of 69, Table 2-3, were changed to reflect changes in telemetry for eight lift stations in 2008; and wet weather influence for Freyer Rd lift station was downgraded from High to Moderate due to improvements made in 2008.

- Page 19 of 69, Figure 2-3, was changed to reflect changes in telemetry for lift stations in 2008

- Page 23 of 69, Section 2.8, last sentence, "proposed 2008 303(d) list" changed to "final 2008 303(d) list"

- Page 25 of 69, Section 2.9, last sentence at top of page, was changed from "2000 through 2007" to "2000 through 2008"

- Page 26 of 69, Section 3.1, added Organizational Chart

List of Revisions to Made to CSSOP for 2008 Submittal

- Page 29 of 69, Section 3.5, last sentence, was changed from "2006 and 2007" to "2007 and 2008"
- Page 31 of 69, Table 3-2, was modified to include 2007 and 2008 data for industrial users
- Page 32 of 69, Section 3.5, was changed from "2006 and 2007" to "2007 and 2008"
- Page 35 of 69, Section 4.2, added graph of annual line blockages
- Page 37 of 69, Section 4.4, added last sentence at bottom of page regarding 2008 work
- Page 38 of 69, Section 4.5, last full paragraph, second sentence, was updated with actual results and statement of continued efforts, and modified to include what percentage was trained for video analysis, etc.
- Page 40 of 69, Section 4.6, first paragraph, sentence beginning "Twenty-six…", was changed to "Thirty-three (33) lift stations have been converted through the end of 2008"
- Page 49 of 69, Section 5.4.1.2, updated inspection plans
- Page 52 of 69, Section 5.5.3.2, documented inspection
- Page 59 of 69, Section 5.8.2, last sentence, was changed from "through December 2007" to "through December 2008"
- Page 60 of 69, table 5.3 was revised accordingly
- Page 61 of 69, Section 5.8.3.2, changed "2006 through 2007" to "2006 through 2008"; and updated this section to include 2008 history
- Page 63 of 63, Section 5.8.3.3, expanded list of storms and corrective actions taken/planned
- Page 64 of 69, Section 5.8.3.4.1, last sentence, second paragraph, was changed from "2000 through 2007" to "2000 through 2008".
- Page 65 of 69, Section 5.8.3.4.5, was changed from "2000 and 2007" to "2000 and 2008".
- Page 67 of 69, Section 6.2, was changed by adding data or verification to substantiate completion of 2008 goals

List of Revisions to Made to CSSOP for 2008 Submittal

- Page 69 of 69, Section 6.5, second paragraph, changed last sentence to, “That study was presented to the Sanitary Board of Commissioners in 2008, and preliminary engineering studies are ongoing.”

- APPENDIX E, a chart for 2008 was added

- APPENDIX F, Memorandum, dated June 6, 2008, was updated for Freyer Road (page 3 of 12) and Ohio Street (page 8 of 12)

- APPENDIX G, table revised to include 2008

- APPENDIX J, table for 2008 industrial monitoring data was added

- APPENDIX K, revised table to include data for 2008

- APPENDIX N, revised table for 2008 data

- APPENDIX O, revised table for 2008 data

Table of Contents

1 Introduction

This document replaces the report entitled, "Combined Sewer System Operational Plan, Michigan City Sanitary District," dated January 1990, and its July 23, 1996 Revisions. The plan has been updated to reflect the Sanitary District's actual maintenance and control strategies that are currently in place as of the Summer of 2008. Since 1996, significant improvements in the collection system, treatment plant and application of the nine minimum technology controls have been made.

In accordance with NPDES Permit IN0023752, Attachment A, III, B, *"Updates shall include a summary of the proposed revisions to the approved CSOOP as well as a reference to the pages that have been revised"*. Due to the extensive revisions required of the 1996 report, APPENDIX A contains a guide document that cross-references proposed revisions and edits with the previously approved CSOOP.

The Sanitary District of Michigan City continues to work towards the interim goal of minimizing combined sewer overflow impacts on Trail Creek as much as possible and, ultimately, to eliminate combined sewer overflows.

1.1 Historical Activities

The following timeline summarizes the efforts made by Michigan City to comply with various Federal and State of Indiana combined sewer system controls and requirements:

January 1990	The Sanitary District of Michigan City (SDMC) submitted its original Combined Sewer System Operational Plan (CSSOP) to the Indiana Department of Environmental Management (IDEM).
February 1994	SDMC submitted a revision of the CSSOP in response to comments from IDEM in June 1992 (Revision 1).
April 1994	IDEM approved the CSSOP as the CSOOP.
May 1996	IDEM released Indiana's Final Combined Sewer Overflow Strategy, through the Indiana Register, which was written in accordance with the U.S. EPA's 1994 National CSO Control Policy.
June 1996	IDEM requested that SDMC submit a revision to the approved CSOOP that addressed the three new minimum technology-based controls: pollution prevention; public notification; and monitoring to characterize CSO impacts and efficacy of controls. IDEM also requested that SDMC submit a Stream Reach Characterization and Evaluation Report (SRCER) in accordance with the date established in the upcoming NPDES renewal/modification.
July 1996	SDMC submitted revision of the CSOOP to address the three new minimum controls; update select portions of the approved plan; and included a CSO monitoring protocol for completing the SRCER. (Revision 2).
November 1997	IDEM approved a modification to SDMC's NPDES permit that required the submittal of the SRCER to IDEM no later than eighteen (18) months after approval of the CSO monitoring protocol. In addition, SDMC was required to submit a Long-Term Control Plan (LTCP) for combined sewer overflows to IDEM no later than 12 month after the submittal of the SRCER.
September 2000	SDMC submitted the completed SRCER.
April 2002	SDMC submitted LTCP (after approved extension to due date).
November 2003	SDMC responded to IDEM review of LTCP.
December 2003	SDMC responded to final IDEM review of LTCP.
April 2004	IDEM approved LTCP, pending modification of NPDES permit.
January 2006	IDEM approved modification of NPDES permit including final approval of LTCP and requirement to update CSOOP annually, starting 12 months after effective date of permit modification (February 13, 2006).
July 2008	SDMC submitted Revision 3 to CSOOP

1.2 Scope

This document is written to provide the Sanitary District of Michigan City with a Combined Sewer Overflow Operational Plan (CSOOP). This plan is written to include mechanisms and specific procedures to ensure that the nine minimum technology-based controls for combined sewer overflows are followed and activities are properly documented. The nine minimum controls include:

- Proper operation and regular maintenance;
- Maximum use of the collection system for storage;
- Review and modification of pretreatment programs;
- Maximization of flow to the POTW for treatment;
- Prohibition of CSO discharges during dry weather;
- Control of solid and floatable materials in CSO discharges;
- Pollution prevention programs;
- Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and,
- Monitoring to effectively characterize CSO impacts, and the efficacy of CSO controls.

1.3 Operation Plan

This Combined Sewer Overflow Operational Plan shall be divided into the following chapters:

Chapter 1	Introduction
Chapter 2	System Inventory
Chapter 3	Administrative Aspects
Chapter 4	Maintenance
Chapter 5	Control Strategy
Chapter 6	Schedule of Activities

1.4 Combined Sewer System

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to receiving waters.

1.5 Problems Associated with Combined Sewer Systems

These overflows, called combined sewer overflows (CSOs), contain not only storm water but also untreated human, commercial, and/or industrial waste; potentially toxic materials; and debris. They are a major water pollution concern for the approximately 772 cities in the U.S. that have combined sewer systems.

1.6 Combined Sewer Controls

Technologies exist to control pollution from combined sewer overflows and storm water runoff. They can be grouped into three main categories. A brief discussion of each category follows:

1) SOURCE CONTROLS includes those measures for reducing pollution from combined sewer overflow and storm water which involves actions within the urban drainage basin before urban water reaches the sewer system, and affecting the quantity and quality of the aforementioned pollution.
2) COLLECTION SYSTEM CONTROLS are intended to insure that the combined sewer system operates as efficiently as possible and that maximum advantage is taken of opportunities to reduce combined sewer overflows.
3) TREATMENT CONTROL removes pollutants from combined sewer overflows.

The following Table 1-1 summarizes how the nine minimum technology-based controls and the three main pollution control categories interrelate:

Table 1-1

Nine Minimum Technology-Based Controls	Pollution Control Categories		
	Source Control	Collection System Control	Treatment Plant Control
Proper operation and maintenance of collection system		X	
Maximum use of collection system for storage		X	
Review and modification of pretreatment programs	X		
Maximization of flow to POTW for treatment		X	X
Prohibition of CSO discharges during dry weather		X	X
Control of solid and floatable materials in CSO discharges		X	X
Pollution prevention programs	X		
Public notification to ensure that public receives adequate notification of CSO occurrences and CSO impacts	X		
Monitoring to effectively characterize CSO impacts, and efficacy of CSO controls		X	X

2 System Inventory

2.1 Service Area

2.1.1 Geographical

The Sanitary District of Michigan City service area is located in northwest LaPorte County, Indiana, and is generally bounded on the north by Lake Michigan; on the east by I-94; on the south by LaPorte County Road 400 North; and on the west by the LaPorte-Porter County Line Road. Figure 2-1 shows the general boundaries of the geographical service area.

Figure 2-1

2.1.2 Geological

During the period of the Wisconsin glaciation, the Lake Michigan ice lobe, which had excavated the Lake Michigan basin, extended to points south of the city. The furthest extent is indicated by the Valparaiso Moraine, which generally parallels US Hwy. 30. As the ice melted, the glacier retreated to the north leaving a crescent shaped lake between the ice lobe and the Valparaiso Moraine. The resulting body of water was called Lake Chicago and is the ancestor of the present Lake Michigan. The highest elevation of Lake Chicago is 640 feet above mean sea level.

In time, the level of glacial Lake Chicago was drastically lowered by the rapid escape of water through newly opened channels or sluiceways into the Des Plaines and Illinois Rivers. Each time a channel opened, a new stabilized lake level was obtained and sand beaches, dune ridges, and swamp areas were formed. The beach sand deposits, now brown in color, were in many cases reworked by the wind into dunes, leaving the gray silty sand and gravel lake deposits exposed to the atmosphere.

The last or most stabilized level of Lake Chicago was approximately 600 feet above mean sea level. Extensive sand and gravel beaches were formed along with dunes and deposited on the gray silty clay glacial till. As the level of Lake Michigan receded from the approximate elevation of 600 to its present elevation of 580, it did so in a series of parallel ridges and sloughs extending in the same general direction as the lake shore.

The post glacial land features are buried under a layer of fine sand, which in turn overlays a deep clay layer. This sand layer extends from Lake Michigan south to US Hwy. 20. The soils south of US Hwy. 20 vary from sand with traces of clay to rather dense, hard clay at the south corporation limits.

2.1.3 Topographical

The City of Michigan City and its surrounding area is situated on a wide plain composed partially of lacustrine or lake deposits and partially of glacial fluvial or river soils. With the exception of a high dune ridge, adjacent to the shore of Lake Michigan, the area generally slopes to the Lake from an elevation of 590 MSL (mean sea level) at the north (Lake Level) to a general high of 670 at the south and southeast. The average ground elevation for the central part of the service area is 630 feet. Large sand dunes are located along the edge of Lake Michigan and are approximately 150 feet in height. The entire area included in the service area drains to Lake Michigan and therefore, is part of the St. Lawrence Drainage Basin, ultimately discharging to the Atlantic Ocean.

An ancient line of dunes extending in a general east-west direction along the north side of US Hwy. 20 are evidence of the ancient shoreline of Lake Michigan.

2.1.4 Hydrological

Surface water sources in the service area include ponds, lakes, streams and various man-made impoundments. The principal surface waters are Lake Michigan, Trail Creek, Lake Clare and Lake Kai.

Stream flow variations are an important parameter for planning purposes. The 7-day, 10-year low flow for Trail Creek is 24 CFS (15 MGD).

2.2 Sewer System

2.2.1 Physical Condition

Previously, the Sanitary District of Michigan City completed sewer rehabilitation through the Federal PL92-500 Program. During this rehabilitation of sewers, bad portions of the system were lined. That rehabilitation project was the result from an Infiltration/Inflow Analysis and Sewer System Evaluation Survey. Other rehabilitation and problem areas have been addressed as needed.

With the opening of a Riverboat Gaming facility in Michigan City in 1997, the City of Michigan City began planning for the implementation of a phased approach for achieving significant storm water separation projects in the remaining combined sewer areas. With the construction of new storm sewers, the City of Michigan City Administration instructed the Sanitary District, the Michigan City Water Department and the City Engineer of Michigan City to employ a "Whole Project Approach" on future storm water separation projects.

The "Whole Project Approach" involved an assessment of all existing public infrastructure in a Project Area; including items such as existing sanitary (combined) sewers, existing water mains, curbs, gutters, sidewalks, trees, etc. Based on this assessment, existing infrastructure that was determined to be substandard in the Project Area would be replaced as part of the storm water separation projects and paid for, primarily, with Riverboat Gaming revenue. The overriding philosophy and direction of the City Administration was that if the City was going to go into a neighborhood and execute a major construction project to install new storm sewers, other infrastructure needs should also be addressed at that same time to minimize the inconvenience to local residents and to achieve cost savings by performing infrastructure replacement simultaneously, rather than one utility or component at a time.

Regarding the physical condition of sewers and the replacement of aging and problematic sanitary sewers during the execution of storm water separation projects, from 2002-2007 the Sanitary District replaced approximately 24,556 lineal feet, or 4.7 miles, of old sanitary sewers that contained defects. Table 2-1 identifies the sanitary sewer replacement achieved using the "Whole Project Approach" for storm water separation projects:

Table 2-1a

Year	Project Name	Lineal Feet of Problematic Sewers Replaced as part of Storm Water Separation Projects
2002	Ohio/Barker	6,655 Lin. Ft.
2003	Ohio/Garfield	1,162 Lin. Ft.
2005	Wabash/Washington 1	3,844 Lin. Ft
2006	Wabash/Washington 2A	4,774 Lin. Ft
2007	Wabash/Washington 2B	3,506 Lin. Ft.
2007	Wabash/Washington 2C	4,615 Lin. Ft.
	Total:	**24,556 Lin. Ft.**
	Total Miles:	**~4.7 miles**

In 2008, the Sanitary District installed new storm sewers in the Lake Hills neighborhood to separate sewers in that area, and the Sanitary District extended sanitary sewer service under the following project names: Palatek, Tryon/Meer North A & B, and Meer South. Additionally, a new storm sewer system was installed on White Oak to provide drainage for this street. Table 2-1a identifies the lengths of storm and sanitary sewers installed in 2008.

Table 2-1b

Year	Project Name	Lineal Feet of Sewers Installed in 2008
2008	Lake Hills (storm)	4,560 Lin. Ft.
2008	Palatek (sanitary)	773 Lin. Ft.
2008	Tryon/Meer North A (sanitary)	5,233 Lin. Ft
2008	Tryon/Meer North B (sanitary)	3,528 Lin. Ft
2008	Meer South (sanitary)	3,395 Lin. Ft.
2008	White Oak (storm)	2,657 Lin. Ft.
	Total:	**20,146 Lin. Ft.**
	Total Miles:	**~3.8 miles**

A plot showing the remaining portions of the current service area containing combined sewers is in APPENDIX B.

2.2.2 Age, Length, Materials, Sizes, and Depths of Sewers

The oldest sewers in Michigan City are over 70 years old. The average age of the sewers in Michigan City is 40 years old. Sewers in Michigan City are made of vitrified clay, concrete, and reinforced concrete. The City has some PVC sewers. Sewers in Michigan City are between 4 and 35 feet deep with an average depth of 15 feet. See APPENDIX C for pipe sizes and corresponding lengths in Michigan City.

2.2.3 Sewer Separation, Improvement and Addition Projects

Since 1962, the Sanitary District of Michigan City Sanitary District has been actively separating the sewers in Michigan City. The Sanitary District has spent $101,649,991 separating their combined sewers, upgrading the existing sewer system and adding additional sewers in new areas. The collection system is approximately 93.3%complete in the sewer separation program. The Sanitary District plans to continue their projects and is presently in the planning phase for the Lafayette-Barker combined sewer area. It is the Sanitary District's belief that the best way to eliminate combined sewer overflows or basement flooding is to eliminate the source. Therefore, the District has continuously been planning, designing or constructing projects to eliminate combined sewer overflows since 1962. The treatment plant was designed in the mid-1960's for an average design flow of 12 MGD. The current plant also has an average daily design flow of 12 MGD and has an average daily flow of 9.73 MGD. The Sanitary District believes that sewer separation projects, along with Infiltration/Inflow control, will not only eliminate overflows but will also provide the additional plant capacity.

2.2.4 Maintenance Practices

The Sanitary District of Michigan City has recently developed a manhole inspection standard operating procedure (SOP PM.2, see APPENDIX D) to ensure that each manhole is inspected and cleaned, as required. Current manhole inspection planning efforts anticipate inspecting the manholes associated with 20 miles of sewer per year and completing all manhole inspections over a 10 year period. Efforts will be made to shorten the overall duration as much as possible, subject to manpower availability.

The inspections will be conducted by District employees using the District's Trimble GPS equipment and EnviroSite pole camera, with observations recorded in an inspection database questionnaire to ensure data consistency. The data will be kept in the GIS database on District servers maintained by the District's IT Department. The IT Department does a regular back up of the data. The data will be available on District servers and access may depend on software licensing and hardware requirements.

Catch basins in remaining combined sewer areas are inspected and cleaned as necessary under the same inspection program. Certain special catch basins, approximately 50, in the "School Street Project" are cleaned and inspected annually as they were designed with deeper sumps in lieu of end-of-pipe storm water BMPs for that project. These catch basins are also treated for vector abatement. Similarly, catch basins on Lake Shore Drive are cleaned and inspected annually.

Problem manholes and catch basins are identified by supervisory review of the databases and are cleaned more frequently. In addition, catch basin cleaning occurs as preventive maintenance before anticipated precipitation events and when street flooding is reported by citizens or other City Departments. Catch basin repair and replacement occur as needed.

The Sanitary District maintenance crew performs lift station maintenance and repair, as required. The forty (40) lift stations are inspected a minimum of once per quarter, and more frequently as other tasks permit. The conversion to real-time telemetry permits the reduction of physical inspection frequency without compromising the operation and maintenance of the lift stations.

2.3 Treatment Plant Flows

The wastewater treatment plant flow averages for 2000 through 2008 are in Table 2-2. The treatment plant has an average daily design flow of 12.0 MGD and a peak hourly design flow of 15.0 MGD. The diurnal high flows may be equalized in the diurnal basins and the high storm flows are detained in the diurnal and storm water detention basins. A detailed explanation of the diurnal/storm basin system is included in Section 5.8.3.1.

The wastewater treatment plant was last upgraded in 2005-07 with improvements to the headworks. The wastewater treatment plant performance continues to meet its NPDES permit. Charts showing the relationship of treatment plant flows to rainfall for 2006 through 2008 are found in APPENDIX E. The new plant facilities will be explained in Section 5.8.1.

Table 2-2

Year	Avg. Daily Flow (MGD)
2000	7.29
2001	7.89
2002	7.36
2003	6.71
2004	6.97
2005	6.26
2006	7.50
2007	8.99
2008	9.73

2.4 Lift Stations

There are forty (40) lift stations that the Sanitary District of Michigan City maintains. Table 2-3 is a list of existing lift stations, with the type of telemetry and to which trunk sewer the lift station ultimately discharges into. A status report on the lift stations is found in APPENDIX F. Flow rate (Q rate) was determined from Wonderware plots of the pump starts and wet well levels for those lift stations that were converted to Mission telemetry. Essentially, the analysis is a pump down test. Actual data from the analyses is found in the Appendices. A summary of available monthly flow data for 2007 and 2008 are found in the Appendices along with plots of daily flow versus daily rainfall. Figure 2-2 shows the locations of each lift station. Figure 2-3 illustrates hierarchy relationships between lift stations and private or proposed list stations.

Table 2-3

No.	Lift Station	Wet Weather Influence [1]	Year of (C)onstruction, In (S)ervice, or (R)ehab.		Q Rate (GPM) [2]	On-Site Generator?	Permanent Building?	Standard Lift Station Design?	In Street or Right-of-Way?	Remote Control Panel?	Fence?	Mission Telemetry?	AT&T -NO ALARM ALARM	54-Inch Trunk Sewer	72-Inch Trunk Sewer
1	Beachwalk	L	C	1992	40							Y		Y	
				2005	???										
2	Beechwood	L	C	1995				Y			Y	Y			Y
3	Birch Tree Farms	M	C	1997	170,196					Y		Y		Y	
4	Broadway	L	R	1992					Y-s	Y			Y		Y
5	Clark	M	R	2000	327,340			Y			Y	Y			Y
6	Coolspring/Roeske	M	C	1985	198,198				Y-r			Y			Y
7	Eastwood	L	C	2000				Y			Y	Y			Y
8	Edgewood	M	C	1997	391,400				Y-r			Y			Y
9	Evergreen Plaza	M	C	1985	???,262				Y-r			Y			Y
10	Fourth Street	H	R	1984	???,37							Y		Y	
11	Freyer Road	M	R	1998	143,210			Y-				Y			Y
12	Glenbrook	L	C	1995				Y-			Y		Y		Y
13	Golfview	M	C	1996	540,517			Y-			Y	Y			Y
14	Henry Street	L	R	1984					Y-s	Y			Y		Y
15	Hidden Shores	L	C	1984	90,65							Y		Y	
16	Jackson Street	L	C	1989					Y-s				Y		Y
17	Johnson Rd & US35	L	C	2001				Y			Y		Y		Y
18	Kieffer Road	L	C	1993					Y-r						Y
19	Kimball Woods	L	C	1990	114,191						Y	Y			Y
20	Krueger School (4 pumps)	M	R	1995	1501, 1269, 1268, 768						Y	Y			Y
21	Lake Avenue	M	R	1984	695,661				Y-s	Y		Y		Y	
22	Lake Hills	M	C	2007	336,353	Y		Y			Y	Y		Y	
23	Lakeland Triangle	L	C	1981					Y-s	Y		Y			Y
24	Liberty Trail	L	C	1988				Y-			Y	Y			Y
25	Marina	L	R	1997	129,184			Y-			Y	Y		Y	
26	Meadowdale	H	C	2003	277,331			Y			Y	Y			Y
27	Menke Rd & US 35 (3 pumps)	M	C	1989	252, ???, 246							Y			Y
28	Michiana Shores	L	C	2000	128,122			Y-			Y	Y			Y
29	Monon Ditch (STORM WATER)	Storm LS	C	1982	2,818		Y				Y	Y		NA	NA
			C	1982	???										
30	Ohio Street	H	C	1985					Y-s	Y					Y
31	Pottawattomie Park	H	C	1983					Y-r				Y		Y
32	Shoreland Hills	L	C	2000	542,575			Y-			Y	Y			Y
33	Sludge Lagoon	L	R	1984	???,110						Y-	Y		NA	NA
34	Smith Valley	L	R	1984	78,82				Y-r			Y		Y	
35	Tall Timbers	L	C	1989					Y-s			Y			Y
36	Tinkers Dam	M	C	1989	432,468					Y		Y		Y	
37	Tryon- Meer Road	L	C	2006	311,343	Y		Y			Y	Y			Y

No.	Lift Station	Wet Weather Influence [1]	Year of (C)onstruction, In (S)ervice, or (R)ehab.		Q Rate (GPM) [2]	On-Site Generator?	Permanent Building?	Standard ift Station Design?	In Street or Right-of-Way?	Remote Control Panel?	Fence?	Mission Telemetry?	AT&T ALARM - NO ALARM	54-Inch Trunk Sewer	72-Inch Trunk Sewer
38	US 12	M	C	1996	476,561						Y	Y			Y
39	US 20/ US35	M	C	2004	343,372	Y		Y			Y	Y			Y
40	Woodlawn	L	C	2001				Y-			Y	Y			Y

[1] L=Low, M=Moderate, H=High; Mission determined from plot of daily flow versus daily rainfall; AT&T from alarm history.

[2] Flow rates determined from Simulated Draw Down analysis performed on February 23, 2008 data. "???" = no pump runs that day.

Figure 2-2

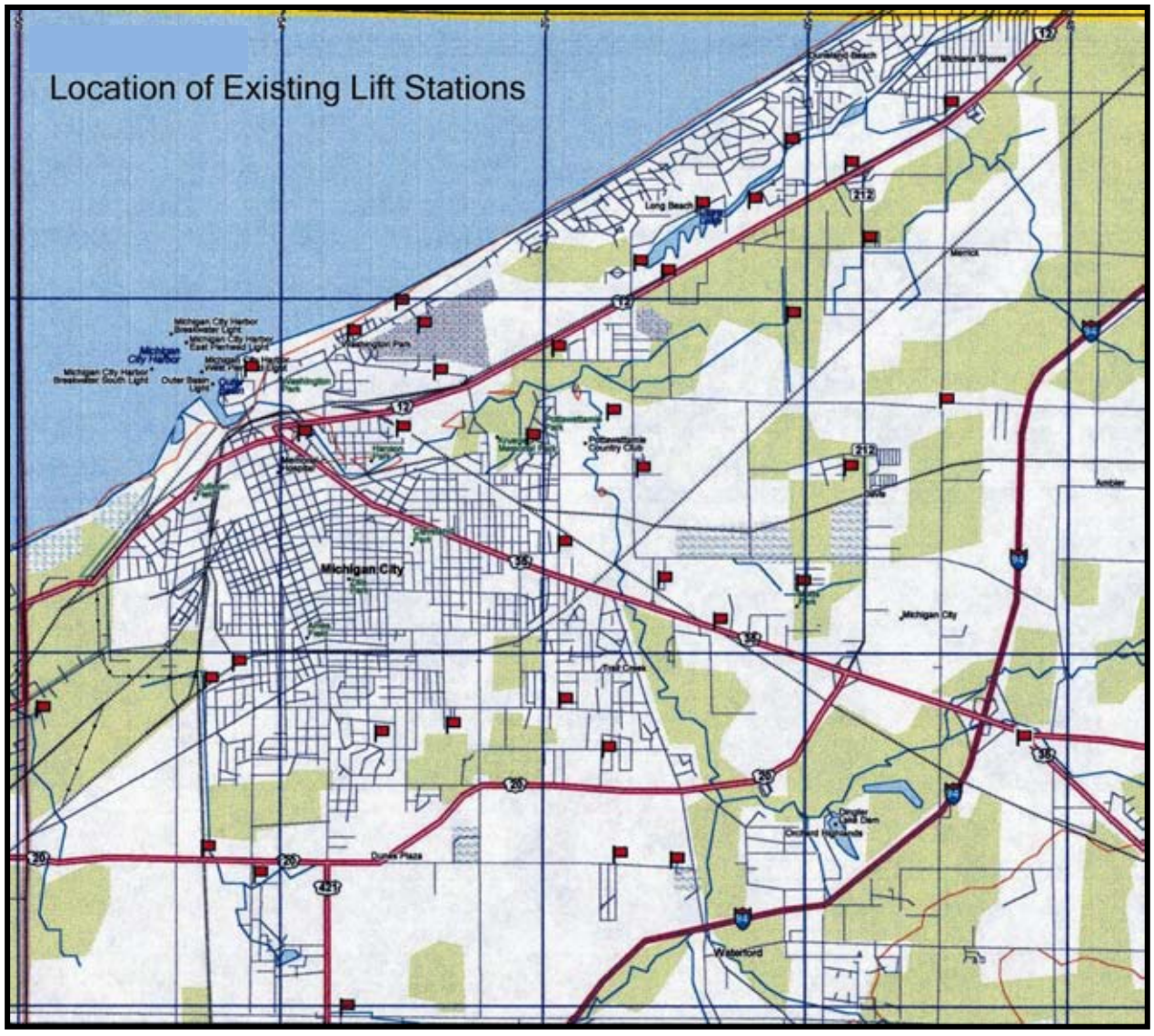
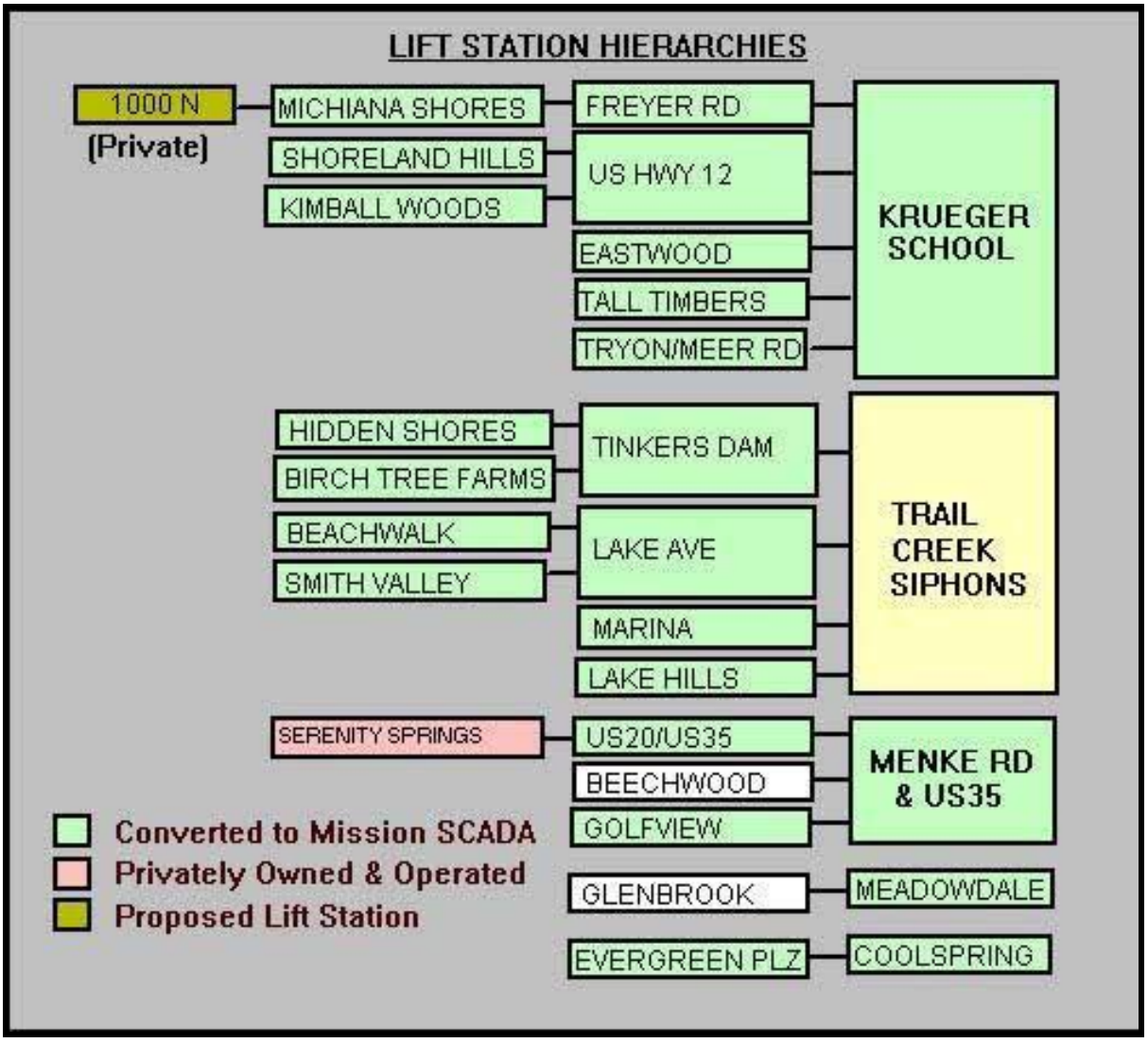


Figure 2-3


LIFT STATION HIERARCHIES
1000 N
(Private)
MICHIANA SHORES
SHORELAND HILLS
KIMBALL WOODS
FREYER RD
US HWY 12
EASTWOOD
TALL TIMBERS
TRYON/MEER RD
KRUEGER SCHOOL
HIDDEN SHORES
BIRCH TREE FARMS
TINKERS DAM
BEACHWALK
SMITH VALLEY
LAKE AVE
MARINA
LAKE HILLS
TRAIL CREEK SIPHONS
SERENITY SPRINGS
US20/US35
BEECHWOOD
GOLFVIEW
MENKE RD & US35
GLENBROOK
MEADOWDALE
EVERGREEN PLZ
COOLSPRING
Converted to Mission SCADA
Privately Owned & Operated
Proposed Lift Station

2.5 Location of CSO Overflow

Table 2-4 summarizes the historical and current status of the CSO overflows. Only one overflow remains, Outfall 002A, which is the discharge from the storm retention basins. The physical structure of Outfall 002A is designed to prevent back flow of the receiving waters into the retention basins**.**

Table 2-4

No.	Description	1983 CSO Study	1984 Plant Improvements	1990 CSSOP	1996 CSSOP Update	Sep 1998 Permit Modification	Nov 1, 2004 Permit	Preliminary Stage Improvement Project 2005-06	Feb 13, 2006 Permit Modification
1	**Corymbo Drive at entrance to WWTP**: relieved excess flows through the 72" trunk sewer via a 3' by 8' wood weir.	**MONITORED**	Eliminated by extending 72" sewer to storm storage basins.						
2	**Eighth Street and NIPSCO substation**: Three sewers (Hobart, Walker, Eighth) collect in a common manhole on a 24" combined sewer. Normal flow drops into a 36" sewer underneath the 24" sewer. When capacity of 24" is exceeded, an overflow weir relieves excess flow and permits a discharge to Trail Creek.	**MONITORED** - No overflows occurred during study.			Plugged up with brick and mortar, thus eliminated.				
3	**East 6th Street**: inverted siphon under the interceptor sewer.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
4	**East End Second Street Bridge**: overflow is located at MH C8.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
5	**Penn-Central Railroad Bridge and the Second Street Bridge**: MH C9 and CC1 are structures constructed as a by-pass to Trail Creek. MH C9 was built on the interceptor sewer with a connection through MH CC1 to Trail Creek.	Connection to Trail Creek is permanently plugged. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
6	**Penn-Central Railroad Bridge and the Second Street Bridge**: MH C11 was built on the interceptor sewer with a connection through MH CE1 to Trail Creek.	Connection to Trail Creek is permanently plugged. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
7	**Northeast of Penn-Central Railroad Bridge**: MH C13 is located at the connection of an 18-inch sanitary sewer along the north side of the Penn-Central RR tracks to the interceptor sewer along the east side of Trail Creek.	Connection to Trail Creek is permanently plugged. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
8	**Fourth Street Box Sewer:** eleven overflows flow into Fourth St. Box Sewer. Sewer is an 8' x 10' concrete box.	**MONITORED**		**Listed as Overflow Point 003. contains eight overflows within collection system.**	**Listed as Overflow Point 003. All overflows to box sewer permanently plugged.**	**Eliminated by modification to NPDES Permit.**			
9	**West of Sixth Street Bridge**: MH B15 is located on 36-inch interceptor sewer. MH BB1B is on a 15-inch line to Trail Creek.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
10	**East side of Spring Street and Fourth Street**: MH BCA1 is located in the SE corner of Spring St. and 4th St. on the 24-inch combined sewer along the E side of Spring St. Excessive flows go over weir to 4th St. box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				
11	**West side of Spring Street and Fourth Street**: MH BCB1 is located at the SW corner of Spring St and 4th St. and is on a 24-inch combined sewer along the S side of 4th St. Excessive flow overflows into 4th St. box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				
12	**East side of Pine Street and Fourth Street:** MH BCD1 is located in the SE corner of Pine and 4th Streets on a 27-inch combined sewer along the E side of 4th St. Excessive flows overflow into 4th St. box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				
13	**West side of Pine Street and Fourth Street**: MH BCE1 is located on the N end of 27-inch combined sewer on the W side of Pine at 4th St. Excessive flow overflow weir to 4th St box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				

Table 2-4 (continued)

	box sewer.								
14	**East side of Franklin Street and Tenth Street:** MH BCF8 is located E of Franklin Street storm sewer at intersection of 10th and Franklin St. on a 15-inch combined sewer flowing N.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
15	**West side of Franklin and Tenth Street**: MHBCG9 is located W of Franklin St storm sewer at intersection of 10th and Franklin St on a 15-inch combined sewer flowing N.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
16	**Washington Street and Tenth Street**: MH BCH10 is located at the head end of Washington Street Strom Sewer a the intersection of 10th and Washington on a 15-inch combined sewer. Excessive flow overflows into Washington Storm Sewer , which discharges into 4th St. box sewer.	**MONITORED** - No overflows occurred during study.			Plugged up with brick and mortar, thus eliminated.				
17	**Carlon Court Between Tenth Street at Donnelly Street**: MH BTC12 is located on Carlon Ct. about center of the block between 10th and Donnelly Street on 30-inch combined sewer from IN St. Prison. Excessive flow overflows weir into Willard St. storm sewer. Willard Ave storm sewer discharges into 4th St. box sewer.	Overflow in kept plugged at all times. Not monitored during study.			Plugged up with brick and mortar, thus eliminated.				
18	**West side of Fourth Street and Inverted Siphon**: at MH B17 there is a 21-inch and 18-inch sewer entering from S and N respectively. There is an inverted siphon from this manhole that carries water under 4th St. box sewer to MH B16. There is an overflow at MH B17 that discharges to 4th St. box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				
19	**East side of Fourth Street and Inverted Siphon**: At MH16 there is a 27-inch line entering from S and inverted siphon from W. a 36-inch line exists to east. MH16 overflows in excessive flow to 4th St. box sewer.	**MONITORED**		An overflow point to 4th St. box sewer.	Plugged up with brick and mortar, thus eliminated.				
20	**Wabash Street and Sixth Street**: MH BC11 a 36-inch sewer overflow to a 36-inch storm sewer which goes to 4th St. box sewer. Overflow in 6' long and 15" high.	**MONITORED**			Plugged up with brick and mortar, thus eliminated.				
A	**WWTP Bypass**: all flows greater than 12 MGD go directly from primary treatment to chlorine contact tanks then to Trail Creek (bypass secondary treatment)	**MONITORED**	Eliminated in 1984 upgrade to WWTP.						
B	**Influent Structure Overflow**: wet weather diversion structure on 54" trunk sewer at headwork. Overflow to 48-inch discharge line to Trail Creek.		Constructed as part of headworks improvement	**Listed as Overflow Point 004**	**Listed as Overflow Point 004**	**Listed as Overflow Point 004**	**Listed as Overflow Point 004**	**Filled with concrete on April 25, 2005**	**Eliminated by modification to NPDES Permit.**
C	**Storm Water Detention Basins Overflow**: a 96-inch overflow discharge line from a 2.5 MG and 2.8 MG storm water storage basins.		Constructed as part of improvement project.	**Listed as Overflow Point 002**	**Listed as Overflow Point 002**	**Listed as Overflow Point 002**	**Listed as Overflow Point 002**	**Listed as Overflow Point 002**	**Listed as Overflow Point 002A**

2.6 Sewer System Problem Areas

Currently, there are four areas of the collection system that need rehabilitation or replacement:

A. Greenwood Avenue between Carroll Avenue and Cleveland Avenue.
B. Ohio Street at US Highway 20 crossing.
C. Spring Street, both sides, between 11th Street and 6th Street.
D. Cedar Street, both sides, between 11th Street and 6th Street.

These areas will be scheduled for upgrades on a priority basis dependent upon their severity and available funding.

2.7 Groundwater Levels

The groundwater table in the service area is generally tilted sharply toward Lake Michigan. A groundwater profile along US Hwy. 421 would, in general, follow a line beginning at elevation 580 MSL at the north end and slope upward to an approximate elevation of 635 MSL at the north side of US Hwy. 20. South of US Hwy. 20, the groundwater table is suppressed due to the thick layer of clay and silt overlaying it. Wells in this area have been constructed to depths of 90 to 120 feet. However, once the aquifer is reached, the water level in the well casing will rise to within a few feet of ground level.

2.8 Quality of Receiving Waters

Trail Creek is the receiving waterbody for the wastewater treatment plant, Outfall 001B, and the discharge from the storm retention basins, Outfall 002A. Trail Creek has a seven-day, ten year, low flow ($Q_{7,10}$) of 24 cfs (15.5 MGD). Trail Creek is in the Lake Michigan drainage basin, and is therefore subject to the Indiana Water Quality Standards applicable to all waters of the State within the Great Lakes System in accordance with 327 IAC 2-1.5.

The wastewater treatment plant outfall to Trail Creek is approximately 1.8 miles upstream of Lake Michigan. The Indiana portion of the open waters of Lake Michigan is designated as outstanding state resource water in accordance with 327 IAC 2-1.5-19(b). Discharge to tributaries of outstanding state resource waters are subject to antidegradation implementation procedures for outstanding state resource waters in 327 IAC 5-2-11.7.

Trail Creek has the following designated uses (327 IAC 2-1.5-5):

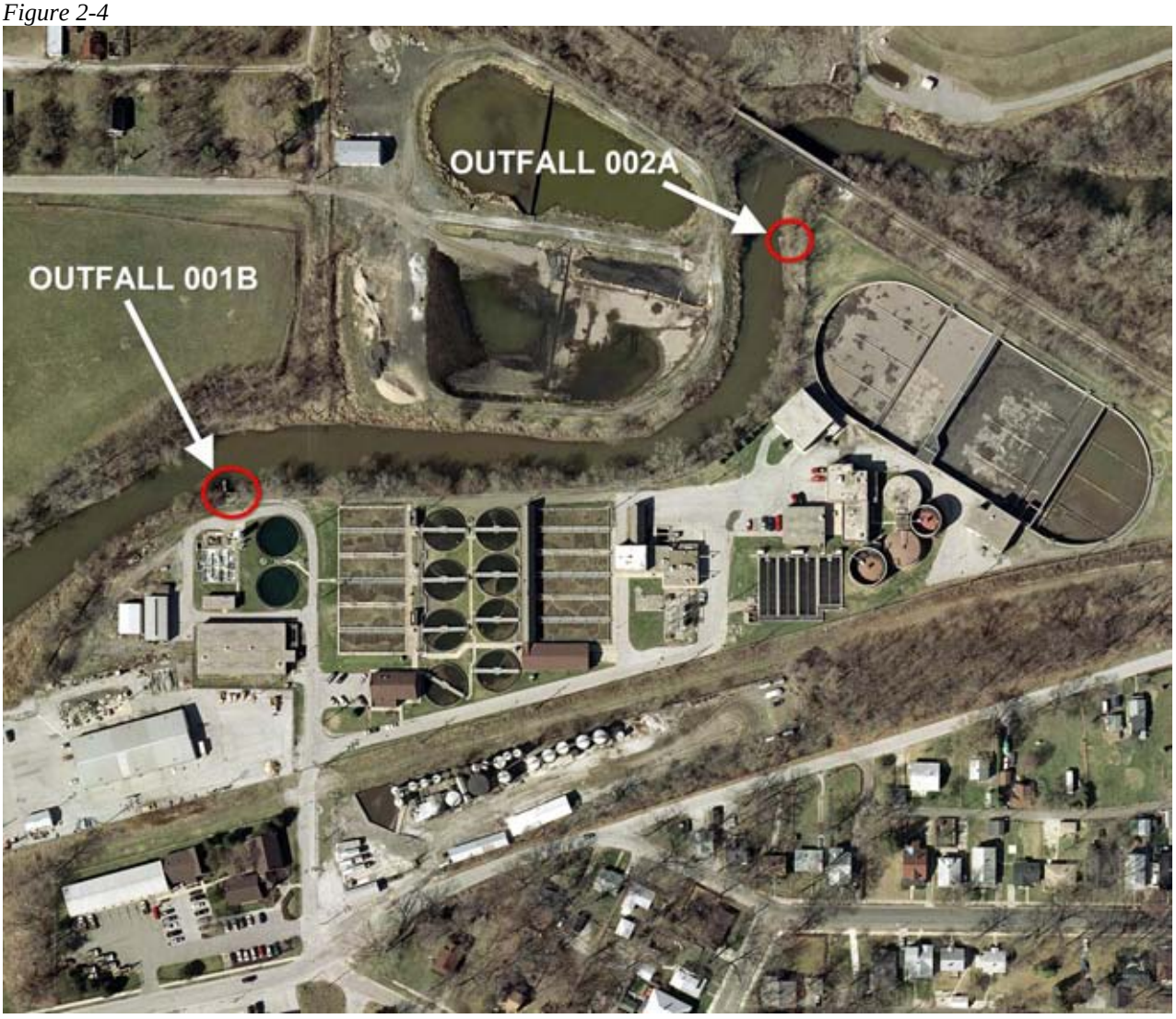
- For full-body contact recreation;
- Capable of supporting a well-balanced, warm water aquatic community; and
- Capable of supporting put-and-take trout fishing.

Trail Creek is also classified as high quality water for all parameters except E. coli, mercury and PCBs under IDEM's 2006 303(d) list. Trail Creek is considered impaired (for designated uses) for E. coli (Category 5C, impairment addressed by TMDL); and for mercury and PCBs on the basis of fish consumption advisories (Category 5B). These same impairments are found in IDEM's final 2008 303(d) list.

2.9 Effluent Standards

The current NPDES permit contains effluent limitations and monitoring requirements for the wastewater treatment plant, Outfall 001B, in Part I, A; and effluent limitations and monitoring requirements for the storm water retention basin discharge, Outfall 002A, in Attachment A, as modified. Figure 2-4 identifies the physical locations of Outfall 001B and 002A.

Figure 2-4



The parameters and effluent limitations, if specified, are summarized in Table 2-5. APPENDIX G contains a table summarizing the wastewater treatment plant performance for conventional pollutants from 2000 through 2008.

Table 2-5

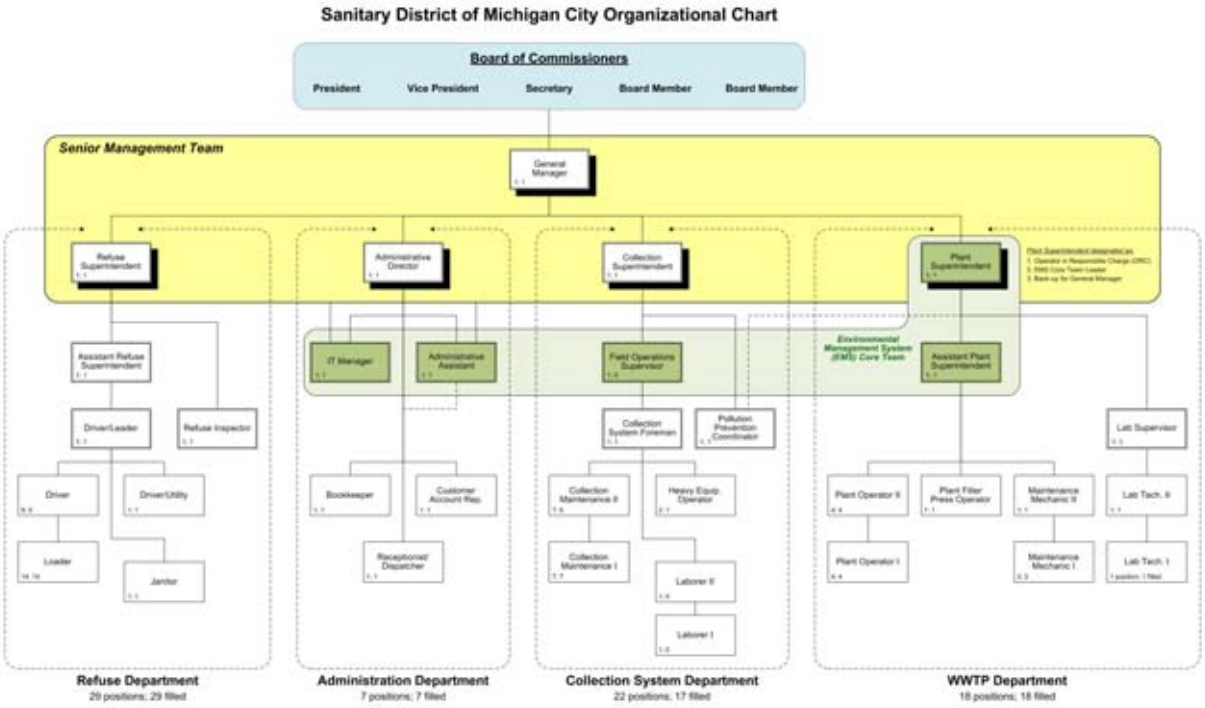
	Quantity or Loading			Quality or Concentration					Monitoring Requirements	
Parameter	Monthly Average	Weekly Average	Units	Monthly Average	Weekly Average	Daily Maximum	Daily Minimum	Units	Measurement Frequency	Sample Type
OUTFALL 001B										
Flow	Report	Report	MGD						Daily	24-Hr Total
CBOD5	626	939	lbs/day	5.0	7.5			mg/l	5 X Weekly	24-Hr Composite
TSS	751	1,127	lbs/day	6.0	9.0			mg/l	5 X Weekly	24-Hr Composite
Phosphorus				1.0				mg/l	5 X Weekly	24-Hr Composite
pH						9.0	6.0	Std. Units	5 X Weekly	Grab
Dissolved Oxygen							7.0	mg/l	Daily	3-Grabs/24-Hrs.
E. coli				125.0		235		col/100 mls	5 X Weekly	Grab
Ammonia-nitrogen										
Summer May 01-Nov 30	163	388	lbs/day	1.3		3.1		mg/l	5 X Weekly	24-Hr Composite
Winter Dec 01 - Apr 30	175	413	lbs/day	1.4		3.3		mg/l	5 X Weekly	24-Hr Composite
Total Residual Chlorine	1.25	2.88	lbs/day	0.010		0.023		mg/l	Daily	Grab
Cadmium, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
Chromium, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
Copper, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
Cyanide, CATC				Report		Report		mg/l	1 X Monthly	Grab
Lead, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
Mercury, TRM										
Interim				10		30		ng/l	Bi-monthly	Grab
Final	0.000163	0.000400	lbs/day	1.3		3.2		ng/l	Bi-monthly	Grab
Nickel, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
Zinc, TRM				Report		Report		mg/l	1 X Monthly	24-Hr Composite
OUTFALL 002A										
Flow	Report	Report	MGD							
CBOD5				Report		Report		mg/l	Daily	24-Hr Total
TSS				Report		Report		mg/l	Daily	Grab
Phosphorus				Report		Report		mg/l	Daily	Grab
Total Residual Chlorine	1.25	2.88	lbs/day	0.010		0.023		mg/l	Daily	Grab
pH						Report	Report	Std. Units	Daily	Grab
Dissolved Oxygen							Report	mg/l	Daily	Grab
E. coli						235		col/100 mls	Daily	Grab
Ammonia-nitrogen				Report		Report		mg/l	Daily	Grab

3 Administrative Aspects

3.1 Responsibilities

The Sanitary District has a Board of Commissioners consisting of four members, appointed to four-year terms by the Mayor of Michigan City. The City Engineer, the fifth member, serves by virtue of his/her office.

The senior management team consists of a General Manager, with four area superintendents: Administrative Director, Collection Superintendent, Plant Superintendent and Refuse Superintendent. The Administrative Director has responsibility for the business operations and IT operations. The Collection Superintendent is responsible for the sanitary, storm and combined sewers; is the MS4 Operator; and is responsible for court ordered drainage ditch maintenance. The Plant Superintendent is responsible for the WWTP operations and maintenance, lift station operations and maintenance, the laboratory, and is the Operator in Responsible Charge. The Refuse Superintendent has responsibility for municipal refuse collection and disposal.



3.2 NPDES Permit

The current NPDES Permit (IN0023752) became effective on November 1, 2004 and was modified effective February 13, 2006. Attachment A of the permit contains Precipitation Combined Sewer Overflow Discharge Authorization Requirements. Attachment A, as modified, is found in the APPENDIX H.

3.3 City Ordinances

In 1962, the Sanitary District Board of Commissioners approved an Engineering Report prepared by Boyd E. Phelps, Inc, which stated the following:

"…no further consideration could be given to including or discharging additional storm water drainage in the existing system [collection system, sic], without increasing surcharge and resulting in the increase in basement flooding for buildings connected to the system."

As a result of that action, no new combined sewers have been constructed in Michigan City since that date.

The 2006 modification to Attachment A of NPDES Permit IN0023752 contains the following requirements:

"The Sewer Use Ordinance needs to …

- *Prohibit construction of any new combined sewer or outfall;*
- *Prohibit any new connection to any combined sewer, unless the flow from the new connection will not cause or contribute to discharge from any portion of the POTW; including the collection system, other than Outfall 001; and*
- *Require that for any new dwelling or building connection to the combined sewer, any storm water connection be made separate and distinct from any sanitary waste connection to facilitate disconnection of the former if a separate storm sewer subsequently becomes available.*

Current City Code contains the following items:

- **City Code Sec. 98-311, Discharge of unpolluted water to sanitary sewer, states***: No person shall discharge or cause to be discharged any unpolluted waters, such as stormwater, groundwater, roof runoff, subsurface drainage or cooling water, into any sanitary sewer.*

- **City Code Sec. 98-315, Dilution of discharge, states***: No user introducing wastewater pollutants into a publicly owned treatment works shall augment the use of potable water process wastewater or mix separate waste streams or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with any standards set forth in this article.*

- **City Code Sec. 98-225(h), Building Sewers and Connections states**: *No person shall make a connection of roof downspouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building drain which in turn is connected directly or indirectly to a public sanitary sewer.*

- **City Code Sec. 98-312, Discharge of storm water, states:** *Stormwater and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as storm sewers, or to a natural outlet approved by the manager or approval authority and state or local agencies.*

- **City Code Sec 98.225(i), Specifications for connection, states:** *The connection of the building sewer into the public sewer shall conform to the requirements of the building and plumbing codes or other applicable rules and regulations of the city and the sanitary district. All such connections shall be made gastight and watertight, and verified by proper testing. (See sections 22-111 and 22-232, which adopt state rules and regulations.)*

- **City Code Sec 98.225(l), Determination regarding system capacity, states:** *No connection shall be made, nor shall a permit to make a connection be issued, until and unless it has been determined by the manager that there is sufficient capacity in all downstream facilities to properly handle the additional effluent.*

- **City Ordinance No. 2660** requires storm water retention.

- **City Code Sec. 22-232, Adoption of state plumbing code, states**:

a) *The Indiana Plumbing Code, 1985 edition (675 IAC 16), is hereby adopted by reference as the rules and regulations governing the construction and alteration of buildings and structures in the city.*
b) *Notwithstanding any other provision of law, the plumbing rules and regulations as adopted in this section shall apply to all building and structures, including one- and two-family dwellings.*
c) *A copy of this code and the rules, regulations and codes adopted in this section by reference are on file as required by law in the office of the city clerk.*

The Sanitary District's Legal Counsel reviewed the above code and determined that the current City Code meets the intent of the requirements of Attachment A. An email notification of that finding is found in APPENDIX I. Full City Code can be found at www.emichigancity.com

3.4 Sewer Use Agreements

The Sanitary District of Michigan City has sewer use agreements with individual property owners that are signed by the Sanitary District and the following entities: Town of Pottawattomie Park, Town of Trail Creek, and Town of Long Beach. These agreements do not allow storm water to be put into the sewers covered therein. These agreements are on file at the Administrative Offices of the Sanitary District.

Under all of the agreements, the Sanitary District has ownership and maintains the collection system and all appurtenances, including lift stations, if applicable.

3.5 Industrial Wastewater Permits

A list of permitted Industrial Users and their discharge locations is found in Table 3.1; and a summary of the monitoring data is found in Table 3.2. Full monitoring data for 2007 and 2008 are found in APPENDIX J**.**

Table 3-1

Industrial Waste Pretreatment Permittee	Permit #	SIC #	Cat. IU?	What Cat.?	Discharge Location	Sewer System
Triplex Plating, Inc 1555 E US 12 Michigan City, IN 4360-2004	001	3471	YES	413.14	manhole CD15	C
Vitamins, Inc. 1700 E. US Rt. 12 Michigan City, IN 4360	002	2041	no	N/A	manhole CFD22	C
Lyon Workspace Products (Michigan City Storage Solutions) 1000 W. Barker Ave Michigan City, IN 46360	004	2542	YES	433.17	manhole AQV11	A
Midwest Custom Finishing 800 Royal Road Michigan City, IN 46360	005	2851	YES	433.17	manhole ANZ50	A
Waste Inc. Landfill RD/RA Group 1701 E. Hwy 12 Michigan City, IN 46360 O&M Contractors: LFR Elgin, IL 60123-6302	006	N/A ***See Note***	no	N/A	manhole on 8th St. & Winding Creek Cove	A
Federal-Mogul Corporation 402 Royal Rd Michigan City, IN 46360-2795	008	3714	YES	433(A).17 464.46(a)and(d) 428(F).66 428(J).106	Unnumbered manhole at FM's private line & District's line to Karwick LS N of property	A
Sullair Corporation 3700 East Michigan Blvd Michigan City, IN 46360	010	3563	no	N/A	unnumbered manhole on SE corner of property	A

Unused Permit Numbers:

#003 Dwyer Products - 418 N. Calumet; No longer categorical 1999; out of business

#007 Blocksom; operational but no process flow.

#009 Previously Anderson Co. (Anco); out of business. Facility occupied by Federal-Mogul, permit #008.

NOTE: Closed superfund site, refer to www.epa.gov/region5superfund/npl/indiana/IND980504005

Table 3-2

Industrial Permit No.:		001		002		004		005		006		008		010	
Industrial User:		Triplex Plating, Inc.		Vitamins, Inc.		Lyon Workspace Products		Midwest Custom Finishing		Waste Inc. Landfill		Federal-Mogul Corp.		Sullair Corp.	
Parameter	Units	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Daily Flow	MGD	0.0413		0.014		0.0066		0.0059		0.0177		0.061		0.0016	
pH (high/low)	SIU	9.9/8.4				7.0/6.9						9.2/6.5		9.9/9.1	
Arsenic, t	mg/l									0.0216					
Cadmium, t	mg/l	0.004				0.004		0.004				0.005			
Chromium, t	mg/l	0.337				0.044		0.091				0.044			
Copper, t	mg/l	0.064				0.187						0.010			
Lead, t	mg/l	0.015				0.013		0.013				0.050			
Mercury, t	mg/l									<0.0002					
Nickel, t	mg/l	0.011				0.100		0.010				0.057			
Silver, t	mg/l					0.006		0.003				0.010			
Zinc, t	mg/l	0.531				0.290		0.349				0.157			
Total Metals	mg/l	0.684													
Oil & Grease	mg/l			26.1								6.20		3.6	
Cyanide, t	mg/l	0.010				0.010		0.010				0.010			
TTO	mg/l											0.187			
TPH	mg/l			5.1										3.8	
non-TPH	mg/l													2.7	
PCB's	mg/l									<0.0010					
Ammonia-N	mg/l									87.1					
TSS	mg/l			127											
TBOD5	mg/l			584											

All industrial users were in compliance with categorical and local pretreatment standards during 2007 and 2008. Since the only remaining CSO outfall is the Storm basin, NPDES Permit Outfall 002A, there is no significant impact on CSOs by industrial users.

Additionally, industrial users do not discharge storm water to the sanitary or combined sewer systems in Michigan City.

3.6 Analysis of System Capacity

An analysis of treatment plant influent flows versus average daily and peak hourly design flows was conducted in 2007 and updated in January 2008 as part of master planning for the next 20-year cycle. APPENDIX K has a summary table containing that data.

From the data, two conclusions can be drawn: first, for most months with heavy rainfall, the maximization of flows through the treatment plant can result in a monthly average flow in excess of the average daily design flow and over 80% of the peak hourly design flow; and second, despite an active program to separate combined sewers, there remains a significant wet weather impact on the treatment plant flows.

Master planning is ongoing and will attempt to address these issues and the need for continued combined sewer separation, infiltration and inflow control measures, and treatment plant improvements, including an increase in peak hourly design flow.

4 Maintenance

4.1 Source Controls

Technology-based controls, also known as the nine minimum controls, are designed to minimize the impact of combined sewer overflows on the water quality of the receiving water body by utilizing source control and collection system controls. These include pollution prevention programs, pretreatment programs, and proper operation and maintenance of the collection system to minimize the duration of overflows and maximize flow to the treatment plant. Since all the collection system overflow points have been eliminated, the technology-based controls result primarily for maximization of flows for treatment.

4.2 Identification of Sewer System Problem Areas

Sewer system problems are identified from various sources: telephone requests for service (this is the most common means); citizen complaints by email, walk-ins, meetings, etc.; information transferred from and generated by other Municipal Departments; and District generated work orders resulting from in-house inspection and maintenance programs.

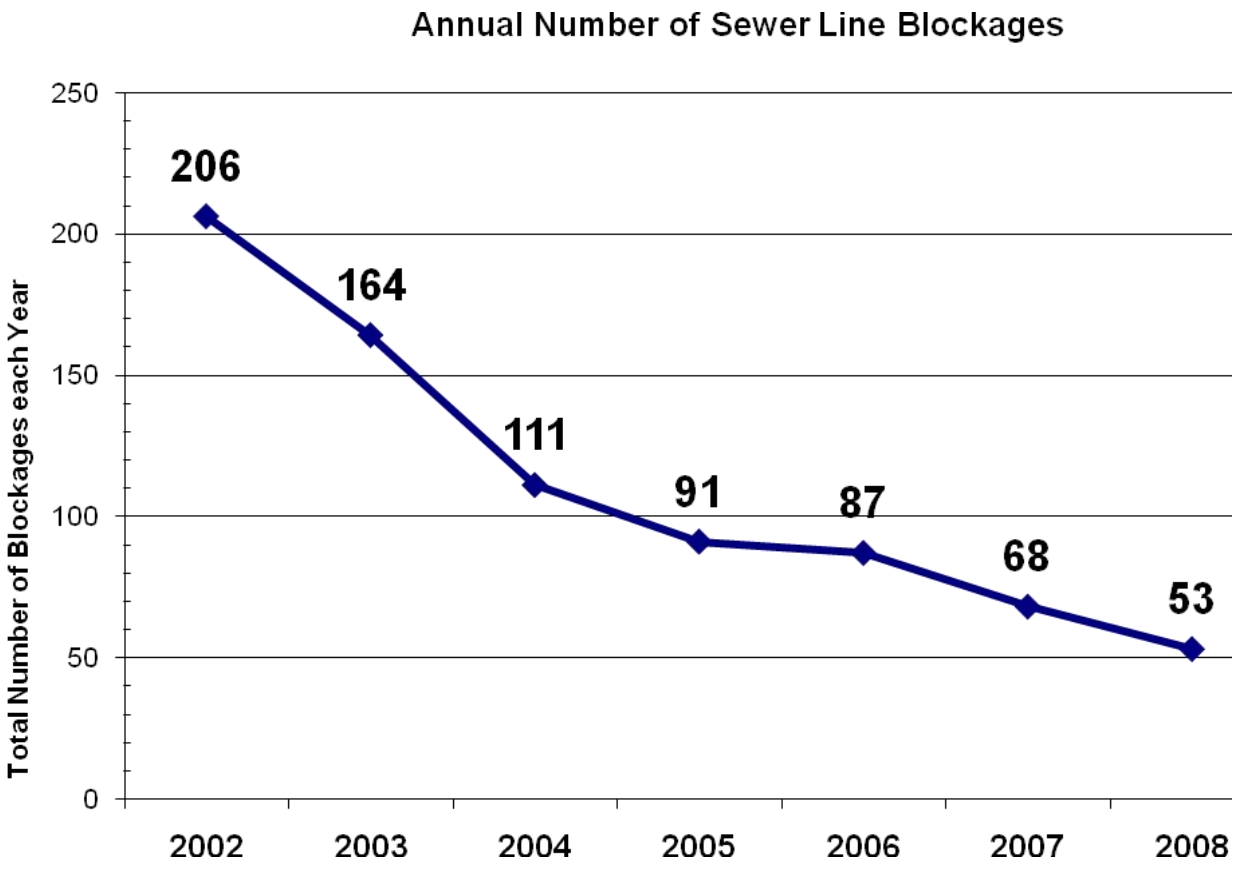
Data on sewer system problems is tracked using an in-house two-section paper Work Order system and entered into a MS Access database designed in-house to track Work Orders (see APPENDIX L). Identified problems are recorded on Section I of paper work order and dispatched to work crews by radio from the dispatcher or by management assignment. The work crew generates a Section II paper Work Order which is turned in at the end of the day to the District Foreman who examines the work order for completeness and notes additional work which may be required. If additional work is required, the Work Order is not turned in as completed. The District Foreman turns in Section II paper Work Orders to the Dispatcher who combines the Section I and Section II and enters the data into the Work Order database. The paper Work Orders are filed by year and stored. The computer database is archived for reference use and is backed up by the IT department on a regular basis.

The District Collection System Foreman and the Field Operations Supervisor review the data to determine the location of problem areas. A monthly and yearly report of Work Orders is printed and reviewed by the Field Operations Supervisor for analysis of trends and problem areas. A special emphasis is placed on the incidents of sewer blockage and the reduction of these incidents by increased preventive maintenance or other means of reducing the occurrences. These records are kept by the Field Operations Supervisor.

After reviewing the information from the work summary report and Work Order database report, the Field Operations Supervisor notes any duplicate location or repeated calls to a specific area and the cause of the sewer system problem (grease, debris, sand, roots, failed pipe, etc.) and determines an appropriate action to resolve these problems. If the problem resolution requires more than one isolated action, the problem is added to one of three

monthly activity logs (Jet, Cut, or Vacuum) for repeated corrective action to resolve the problem. The monthly activity logs are generated at the beginning of each month and are assigned to collection crews by the District Foreman. Completed monthly logs are filed for future reference and analysis to determine if the location remains on the monthly log for repeated action.

A summary of annual line blockages from 2002 through 2008 is provided below.



4.3 Street Cleaning

Street cleaning, to remove debris, dirt, and dust, is used to reduce the source of storm water related pollutants. The majority of the street contaminants are soil and asphalt erosion, automobile contaminants, and sand (due to our area). Street cleaning is accomplished by mechanical broom sweepers. Mechanical broom sweepers loosen dirt from the street surface and collect it in a temporary hopper. The Michigan City Street Department cleans the City streets weekdays from early spring to late Fall, when the dangers of freezing are not present. The City of Michigan City has two street sweepers in use. The City is split into three sections. Both sweepers work in the same section and complete all streets in the section within a week. Each section is repeated every three weeks.

4.4 Catch Basin Cleaning

A catch basin is a chamber well which accepts street surface water and discharges into a sewer. The catch basin has a sediment sump at this base which traps some of the coarse debris and grit from the surface water. This minimizes sewer clogging and reduces the amount of pollutants which may enter and eventually settle out in the sewers. Cleaning of these catch basins prevents accumulation of sediment which can become re-suspended and enter the sewer with the basin overflow.

The District is currently building the primary GIS layer of sanitary sewer manholes. Initial data acquisition for approximately 50% of the system has been completed. As this data is overlaid on a base map, another pass will be made to televise/inspect the manholes; obtain inlet and outlet sizes and directions; and televise/inspect the inlet and outlet piping. In the combined sewer areas this will include catch basin mapping. An enumeration of catch basins at street intersections is available; however, it has not been evaluated for completeness or relationship to the combined sewer areas. The list of catch basins will be compared to the map of combined sewer areas and the number of catch basins will be noted on the map. Field personnel know the location of all catch basins, but the information must be put on a map.

The Sanitary District of Michigan City currently uses two-man crews, consisting of one Sewer Maintenance I and one Sewer Maintenance II job classification. The crews use combination jet/vacuum trucks and receive their daily assignments from the Field Operations Supervisor. One crew is assigned to emergency service calls; the second crew is assigned to preventive maintenance, conducted over a three-year cycle; and the third crew is assigned to the GPS/video duties, conducted on a ten-year cycle.

For street safety in winter driving conditions, for the last four years the City has routinely used salt mixed with an organic beet juice (proprietary) mixture rather than sand. The first use of sand by the City in recent years was early 2008 when there was no more salt to be purchased. Sand was applied reluctantly as a last choice. A new salt shelter has been built to stockpile additional salt.

Street inlet discharge pipes to the downstream sewer are generally unrestricted. However, there are recently installed flow restrictors in catch basins at South and Lafayette Streets and on Loran Road and Frey Court. These restrictors successfully prevent surcharging of the combined sewer during heavy rains. Both of these combined sewer areas are scheduled for separation. Other restrictors will be enumerated as the manhole/catch basin inspection is completed. The street drain with restrictor at Loran Road and Frey Court was physically disconnected from the sanitary sewer system in 2008 as part of the Lake Hills Strom Sewer Project.

4.5 Sewer Flushing

The dry weather deposition of solids in sewers is a major cause of the "first-flush" phenomenon. The average dry weather flow velocities are inadequate to keep solids suspended, especially where sewer grades are flat. Up to 30% of the total collected solids may be deposited in combined sewers. Periodic sewer flushing can remove and transport the material to the treatment plant before a storm event washes it into a receiving stream via an overflow. Sewer flushing also maximizes the hydraulic capacity of the sewer for wet weather flows.

All sanitary and combined sewers are cleaned or inspected once every three years. Sewers are also cleaned on each service request call as part of the SOP for service call response.

The Field Operations Supervisor determines the areas for cleaning and inspections. The preventive maintenance cleaning is sequential and consequently, if crews are diverted to a higher priority area, such as cleaning in preparation for an imminent construction project, the crews will return to the proper area in the sequence.

Data on sewer system Preventive Maintenance is tracked using a MS Access database designed in-house to track this work. The database is archived for reference use and is backed up by the IT department on a regular basis.

As stated, a two (2) person crew, commonly consisting of a Sewer Maintenance I and a Sewer Maintenance II, cleans and/or inspects all sanitary sewers every three years. Sewer cleaning consists of flushing unless an excessive amount of debris is noted by the crew. If debris is noted, the line is vacuumed while flushing. All District flushing vehicles are combination jet/vacuum units. Jet/Vacuum cleaning of the segment upstream of a lift station requires the presence, or at a minimum, notification of the lift station department.

Records are kept on sewer blockages and reviewed in accordance with the procedures described in Section 5.1.

Sewer televising is accomplished on an as-needed basis. For 2008, the District goal is to video inspect 20 miles of sewers, or about 10% of our overall system (see Section 6.2). The actual miles for 2008 of video inspection of our collection system was 6.5 miles. It is anticipated that this number will approach or reach our original goals in 2009 due to the training of two additional Video Technician II's in 2008 and their first year learning curves. All collection system personnel are required, as part of their Job Description, to be trained and certified on assisting televising procedures. This was accomplished in late 2008. Work assignments are made based on the current work activity demand. First priority is given to sewer backup issues; second priority to locate requests; and third priority to routine or preventive maintenance requirements.

The system is currently mapped into 36 sections. There are 3 sewer trunk sections mapped by route to the treatment plant. Section A, roughly the City's south and east side, feeds the

72” sewer; section B, roughly the west and central City side, feeds the 54” sewer; and section C, the north side, feeds into the 54” at the E Street Bridge.

4.6 Lift Stations

The Sanitary District of Michigan City Plant Maintenance staff maintains the lift stations on both an emergency and preventative maintenance basis. Corrective maintenance is preformed on an as-needed basis, twenty-four hours a day. For corrective maintenance, the response is determined by the type of alarm telemetry at the individual lift station. In 2005, the Sanitary District began a five year project to convert lift station telemetry from a general alarm/no alarm monitoring to real time cellular telemetry with digital and analog inputs. The District selected Mission Communications, Inc. to provide the telemetry system. Thirty-three (33) lift stations have been converted through the end of 2008. Those lift stations have digital signals for each pump that indicate pump run/off, pump normal/fail, wet well normal/low level, wet well normal/high level, power normal/fail, and backup float control on/off. These lift stations also have an analog input for wet well level. All data is fed to a password protected website and to the Sanitary District's SCADA system through an OPC link. Alarm conditions are visually displayed on the website and SCADA screens and real-time updates are transmitted to the SCADA system.

The remaining lift stations transmit an alarm condition through the closure of a normally open dedicated telephone line. Unfortunately, the nature of the alarm is unknown for these lift stations, and personnel must be dispatched or called out to physically inspect the lift station and determine the nature of the alarm.

In contrast, the Mission equipped lift stations transmit enough data to allow the Operations or Maintenance Staff to make intelligent decisions on the nature of the alarm and priority of the response. For example, if a pump failure alarm is received, but the wet well level is being maintained by the other pump(s), then maintenance personnel may not be dispatched until the next regular work day. APPENDIX M contains an example of an individual lift station screen, the general screen for alarm identification and the Lift Station Response Report.

For preventive maintenance, lift stations have been assigned to four groups. Each group is scheduled for inspection a minimum of once quarterly; and more frequently as other tasks permit. The data from the inspection is entered into a MS Access database; see section 5.1.1. Physical inspections are primarily for wet well conditions, condition of pressure transducer and backup float switches, test of the alarm system, and general condition of the wet well. The conversion of the lift station telemetry to real-time, with pump status and wet well level data, has permitted the Sanitary District to reduce the frequency of scheduled inspections.

4.7 Repairs

4.7.1 Catch Basins

Catch basins are repaired on an as needed basis determined by the procedure described in Section 4.2.

4.7.2 Manholes

Manholes in Michigan City are generally in good condition. Degraded manholes, when located, are grouted to prevent infiltration. Also, during storm water separation and street reconstruction projects degraded manholes are replaced with new pre-cast concrete manholes.

4.7.3 Sewers

Sewers, whether storm, sanitary or combined, are scheduled for repairs on a priority basis, dependent upon the severity and available funding.

4.7.4 Lift Stations

The lift stations in Michigan City are rehabilitated or relocated as needed. In 2001, the Sanitary District adopted a Standard Lift Station Design, which has been used for new or relocated lift stations since the standard has been adopted. New or relocated lift stations in remote or critical areas are equipped with a natural gas-fueled permanent on-site generator.

5 Control Strategy

5.1 Information Services

Since the approval of the CSOOP and its last revision in 1996, reliance on electronic records has increased along with the improvements in that field. As stated in section 4.4, the Sanitary District has begun utilizing GIS technology. Additionally, field observations are routinely entered into MS Access databases, which have been created in-house. This allows easy customization of reports and data sorting for the immediate data needs.

5.1.1 Recordkeeping

Record keeping consists of original blueprints, drawings and Mylar records; some conversion of those records to electronic copies; video tapes and electronic copies; and field paper records and electronic copies. All blue prints, drawings and Mylar records are kept in storage drawers in the Map Room or in the Collection Superintendent's Office. All drawings are listed in a key or index, which indicates the nature of the record (preliminary or as-built, drawing or Mylar), the year of the project, the project name, and the drawer number.

Data acquisition for GIS mapping is recorded on field data sheets and transferred directly to a database periodically.

Requests for service, complaints and problem notification from other City Departments are recorded on a Work Order and are entered into the proper database by the District Administrative Staff. After the problem has been investigated and resolved, the database record is updated by the same staff. This permits the tracking of Work Orders that are still unresolved. See section 4.2 for a more detailed description.

Manhole inspections, as stated in section 2.2.4, are recorded in the field and later entered directly into the GIS database.

Video records, especially the electronic versions, are found on the Sanitary District's internal network. This is also true for the 36 section maps that comprise sewer areas A, B, and C (see section 4.5).

Lift station corrective and preventive maintenance activities are recorded by the maintenance crew on the proper form and later entered into a lift station database by the Plant Superintendent. Additionally, individual electric and natural gas bills are entered into a separate database for evaluation periodically by the Plant Superintendent for trends that might indicate a developing problem.

Finally, lift station alarms are maintained in two separate databases: the first is an integral part of the Wonderware SCADA system, and the second is part of the service provided by

Mission Commnication, Inc. The Wonderware SCADA has a maximum storage time of six months. Consequently, the Plant Superintendent periodically reviews the data and converts critical records to MS Excel or JPEG files for permanent storage. While the maximum holding time for alarms and other stored data in the Mission databases is unknown, it is assumed that there is a time limit, so records are saved frequently, depending upon need. Lift station daily pump starts, pump run times, estimated flows (determined by pump down tests), and rain data are compiled weekly by the Plant Superintendent into a report.

5.1.2 Availability

Ultimately, all collection system data will be stored electronically and available to all collection system personnel and other Sanitary District personnel. Currently, while there is no restriction on access to blueprints and drawings, administrative, superintendent, and foreman level personnel generally utilize these resources. Mylar drawings are not distributed for protection of this resource.

Electronic versions of the 36 section maps are available to all personnel through a workstation computer and are located in an unrestricted shared directory on the internal network. Two workstations are located in the Collection System Building break room for use by Collection System Personnel.

In addition, electronic versions of video records from sewer televising are available to all Collection System Personnel through a web server.

The manhole inspection database is also accessible by all Collection System Personnel through a web server.

Currently, the database for lift stations and electrical usage are available to the Plant Superintendent and Assistant Plant Superintendent. While located on a shared directory, both databases are password protected to prevent accidental corruption. Eventually, a security hierarchy is envisioned to open these records to the maintenance staff.

All Wonderware and Mission alarm databases are accessible by maintenance, operations, and plant supervisory staff. Plant Maintenance crews are equipped with laptops and wireless internet access to view real time status of the lift stations while in the field. These laptops can also be used to access the Mission alarm database when troubleshooting the cause of an alarm at a Mission equipped lift station.

5.1.3 Analysis of Data

As indicated previously (Sections 2.2.4, 4.2, 4.4, 4.5, and 5.1.1), data is collected, compiled and evaluated by the proper personnel for: daily work assignments; identification of developing or actual problems; troubleshooting; and planning.

When problems arise that require cooperation between area superintendents, the issue is discussed openly and cooperatively. Weekly lift station reports are used to identify problems with pump start frequency and run time duration; potential I/I problems; and reserve capacity at Mission equipped lift stations. Often the analysis results in a cooperative, corrective effort between areas of responsibility.

5.2 Precipitation Monitoring

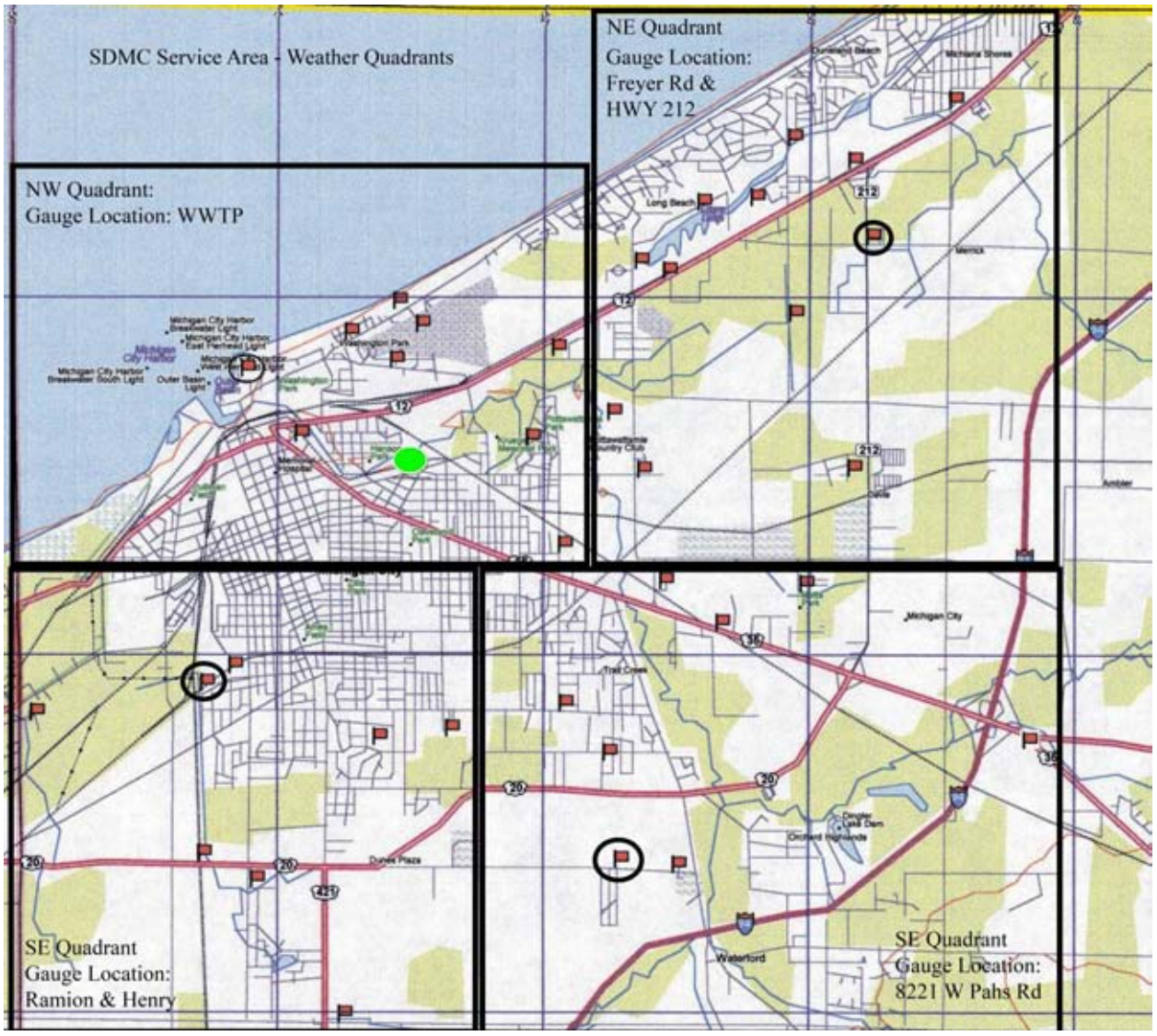
5.2.1 WWTP Weather Station

The Sanitary District wastewater treatment plant has a Davis Instrument Corporation, Model Vantage Pro2 Plus, with rain gauge, wind speed and direction, and barometer. The rain gauge measures rainfall in 0.01inches. Weather data is collected every 15 minutes and recorded in a proprietary database. Data is exported to MS Excel worksheets on a periodic basis for permanent storage and analysis. MS Excel worksheets are stored on a shared directory in the Sanitary District internal Network and are accessible by all employees through their workstations. The proprietary database is accessible by the Plant Superintendent.

5.2.2 Location of Other Rain Gauges

Rain gauges capable of measuring 0.01 inch of precipitation are located at four lift stations within the Sanitary District's service area (see Figure 5-1). The four locations were chosen to split the service area into quadrants and use the appropriate gauge for determining precipitation impacts on individual lift stations or a hierarchy of lift stations. Data is stored on the Mission web site and accessible to key personnel by password. Data is downloaded into MS Excel spreadsheets for analysis of storms and impacts on the collection system, the treatment plant and storm basin.

Figure 5-1


SDMC Service Area - Weather Quadrants
NE Quadrant
Gauge Location:
Freyer Rd &
HWY 212
NW Quadrant:
Gauge Location: WWTP
SE Quadrant
Gauge Location:
Ramion & Henry
SE Quadrant
Gauge Location:
8221 W Pahs Rd

5.3 Preventive and Scheduled Maintenance

5.3.1 Catch Basins

Catch basins in remaining combined sewer areas are inspected and cleaned as necessary under the same inspection program. Certain special catch basins, approximately 50, in the "School Street Project" are cleaned and inspected annually as they were designed with deeper sumps in lieu of end-of-pipe storm water BMPs for that project. These catch basins are also treated for vector abatement. Similarly, catch basins on Lake Shore Drive are cleaned and inspected annually.

Problem catch basins are identified by supervisory review of the databases and are cleaned more frequently. In addition, catch basin cleaning occurs as preventive maintenance before anticipated precipitation events and when street flooding is reported by citizens or other City Departments. Catch basin repair and replacement occur as needed.

5.3.2 Manholes

All manholes are inspected on a ten-year cycle. Manholes are cleaned as necessary under the inspection program or as required while resolving a problem under a Work Order. Problem manholes are identified by supervisory review of the databases and are cleaned more frequently.

5.3.3 Sewers

As stated in Section 4.5, current practice is to clean and/or inspect, for preventive maintenance, all sewers every three years.

5.3.4 Lift Stations

Preventive and scheduled maintenance for lift stations is described in Section 4.6.

5.4 Conventional Combined Sewer System Controls

5.4.1 Side-by-Side Weirs

5.4.1.1 Status

The side-spill weir is constructed parallel to the combined sewer axis to divert flow from the interceptor. Excess flow passes over the side spill weir into the outfall sewer. The weir should be set to hold back peak dry weather flow, as well as to maximize the use of interceptor capacity during wet weather. This regulator may be used for any volume flow. All side-by-side weirs along the Fourth Street box sewer have been sealed; see section 2-5, Table 2-4.

5.4.1.2 Inspections

These weirs will be inspected and photographed in 2008 and annually by June in each subsequent year. While circumstances did not allow us to accomplish this in 2008, we have made this a priority for early 2009. Sampling rounds of 4 wet and 2 dry weather events for E. coli was conducted in 2005 on this sewer. The wet weather counts were an average of 637 c/100ml with rains from 0.24" to 1.22". The dry weather counts were an average of 345 c/100ml. The results do not indicate a direct sanitary sewer cross connection or failure of the sealed openings.

5.4.1.3 Remedial Action Plan

If a breach in the permanent seal is found at any of the former side-by-side CSO points in the Fourth Street box sewer, it will be resealed immediately and documented with additional photographic evidence.

5.4.2 Inverted Siphons

5.4.2.1 Status

The use of internal self-priming siphons has been limited in Michigan City due to the fact that sand accumulated excessively in these siphons and is a major maintenance problem. Inverted siphons are located in the City in the locations indicated below:

(2) siphons under Trail Creek just west of E Street Bridge: Status Active

(1) siphon in alley to east E Street alley between Union St. and Emily St.; conflict with water main; 8": Status Active

(1) siphon in alley to east of Emily Street between Emily St. and Miller St.; conflict with water main; 10": Status Active

(1) siphon on Grand Avenue between Gladys St. and Roeske Ave.; conflict with water main; 24": Status Active

(1) siphon in line between Wolf Ave. and Rogers Ave.; conflict with stream; 8" : Status Active

(1) siphon on U.S. Highway 20 line at east side of Terrace Acres at Terrace Acres; conflict with ditch; 12": Status Active

(1) siphon at manhole B17 West side of 4th Street, closed CSO #18: Status Inactive

(1) siphon at manhole B16 East side of 4th Street, closed CSO #19: Status Inactive

5.4.2.2 Inspections

Siphons are inspected as part of the sewer inspection program identified above.

5.4.2.3 Remedial Action Plan

If siphons are found to have problems, the cleaning frequency is increased by supervisory review of database records.

5.5 Semi-Automatic Regulators

5.5.1 Cylinder Operated Gates

5.5.1.1 Status

Generally, Michigan City has decided to use electrically operated gates in lieu of cylinder operated gates for flow diversion. There is one cylinder operated gate at the headworks of the Stormwater Control Building. In the event of a power failure, the gate automatically closes, which bypasses the bar screen and diverts the storm flow through the 72-inch sewer to the second storm basin.

5.5.1.2 Inspections

Whenever there is a power loss at the wastewater treatment plant, the operations staff inspects the position of this gate.

5.5.1.3 Remedial Action Plan

Once power is restored, if the gate has closed, the operations staff will open the gate.

5.5.2 Motor Operated Gates

5.5.2.1 Status

Michigan City utilizes numerous motor operated gates for flow diversion and overflow at the sewage treatment plant. Section 5.8.1 explains the operation of these gates in detail, as they impact the CSOOP.

5.5.2.2 Inspection

Gates are inspected and maintained by the plant maintenance staff on a periodic basis.

5.5.2.3 Remedial Action Plan

Gates are controlled by a Programmable Logic Controller and are critical to the operation of the treatment plant and storm water management. Consequently, corrective and preventive maintenance is considered critical and of highest priority.

5.5.3 Tide Gates

5.5.3.1 Status

The purpose of tide gates (including backwater gates and flap gates) is to protect intercepting sewers and collecting sewers from high water levels in receiving waters. The gates open and permit discharge at the outfall when the flow in the sewer system regulator chamber produces a small differential head on the upstream face of the gate. A flap gate, or tide gate, was discovered at the intersection of Sixth Street and Willard Avenue approximately 12 years ago. It is a flapper valve from the 27" "Prison" line to the 8'x10' (4th Street) box storm sewer.

5.5.3.2 Inspection

The flapper is forced closed with wood cribbing and checked periodically. Examination of the flapper in 2008 confirmed that the flapper remained closed.

5.5.3.3 Remedial Action Plan

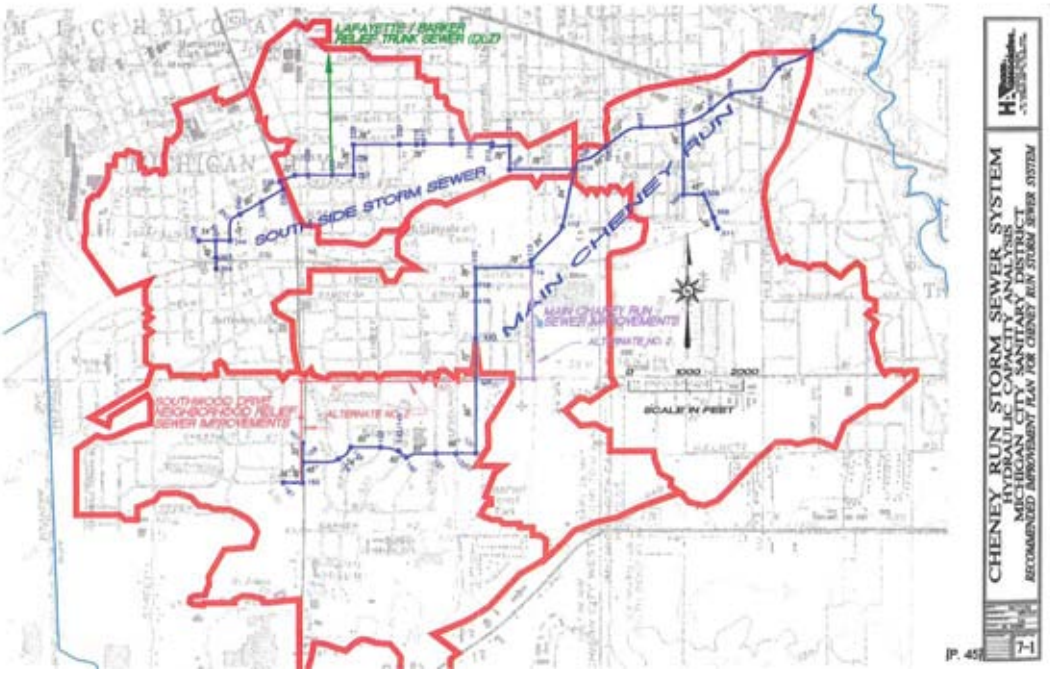
If needed, the flapper will be re-secured as an emergency and high priority task.

5.6 Modeling

The modeling that was completed for the approved CSOOP was valid for that time period and led to the mid-1980's upgrade of the treatment plant and various sewer separation projects. The most recent modeling effort was conducted in 2003 by Haas & Associates, LLC for the Cheney Run storm sewer drainage basin in preparation for separation of the combined sewers in the Lafayette-Barker area of Michigan City. A model was created using VISUAL SWMM, version 7.0, to simulate existing flow within the drainage basin and to evaluate the impact of creating a new storm water outfall to Trail Creek in order to remove the anticipated additional flow from the Lafayette-Barker combined sewer area.

The model was calibrated by flow data collected by a 2-year, 1-hour storm. The model indicated that the Cheney Run storm sewer system was operating at an acceptable level, with four subsystems operating below the 10-year, 1 hour standard. However, the operation was classified as acceptable due to the lack of significant storm water problems in the drainage basin. Under a separate contract, DLZ, Inc. concluded that up to 150 CFS of storm water could be re-directed to a new outfall on Trail Creek. The drainage basin was remodeled with the new outfall and all portions of the Cheney Run storm water system met the standard 10-year, 1 hour service level.

The model indicates that a new storm water outfall must be constructed prior to any separation of combined sewers in the Lafayette-Barker area. The Sanitary District is developing a phased project for construction of that outfall and eventual separation of the combined sewers in that area.



5.7 Maximization of Storage Capacity in the Collection System

5.7.1 General

Procedures to maximize the use of storage capacity of the combined sewer system would be difficult to implement. The Michigan City sewer system is extremely old and sewer separation has proceeded as funding is available and when excessive flooding in an area has prompted the construction of new storm sewers. The use of combined sewers as a storage device results in additional sewer cleaning. Material settlement increases with this type of use.

5.7.2 New or Existing Lift Stations

As sewer separation projects have progressed, sanitary sewers have been added to unsewered areas within Michigan City and wastewater from adjoining communities has been accepted. Often this requires a lift station. When a new lift station is constructed, the on/off levels for pumps are set to safely balance the risk of surcharging the lift station's sewer system with frequency of pump starts and duration of pump run time. With the conversion from alarm/no alarm telemetry to real time telemetry, data was collected which permits adjustment in those level set points to balance these concerns more efficiently. In the case of Tinkers Dam, Freyer Road, and Beachwalk Lift Stations, this has resulted in the utilization of the collection system for storage in order to reduce the frequency of pump cycles and extend the pump run time per cycle.

5.8 Maximization of Flow through Treatment Plant

5.8.1 Process Description

In the mid-1980's, a 54" combined sewer influent line at the treatment plant replaced an existing 42" sewer. This new 54" combined sewer terminated at the old Wet Weather Flow Diversion Structure. The 54" sewer capacity is 35 MGD.

During that same project, the 72" influent line to the treatment plant was extended to the Storm Basins and the 72" overflow was eliminated.

A major impact on treatment plant operations was a result of the Headworks Improvement Project. That project was substantially complete on July 26, 2006, and final completion was November 2006. The project included replacement of bar screens, grit removal, influent pumps, flow control systems and the main switchgear. Since existing equipment was replaced, the new equipment and facilities were phased into operation. Figures 5-2 and 5-3 provide the 'before and after' treatment stage process diagrams and Table 5-1 compares the old and new equipment and operational changes.

Figure 5-2

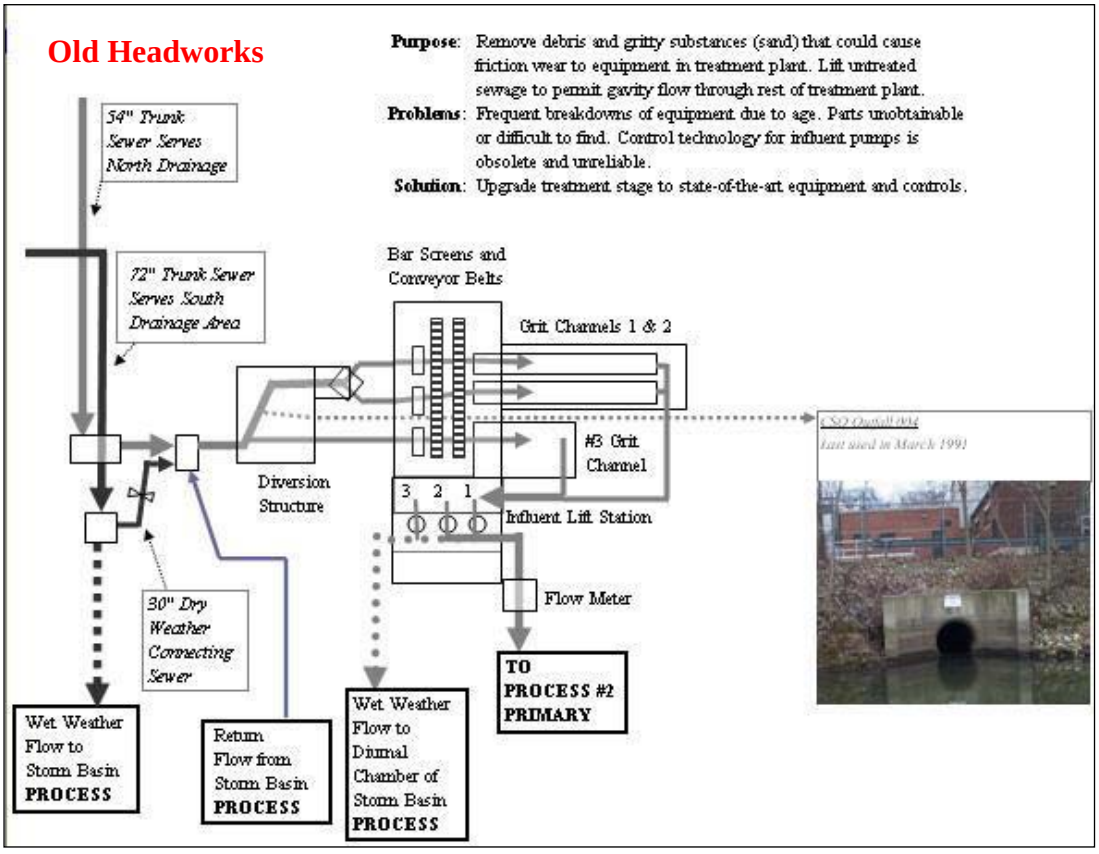


Figure 5-3

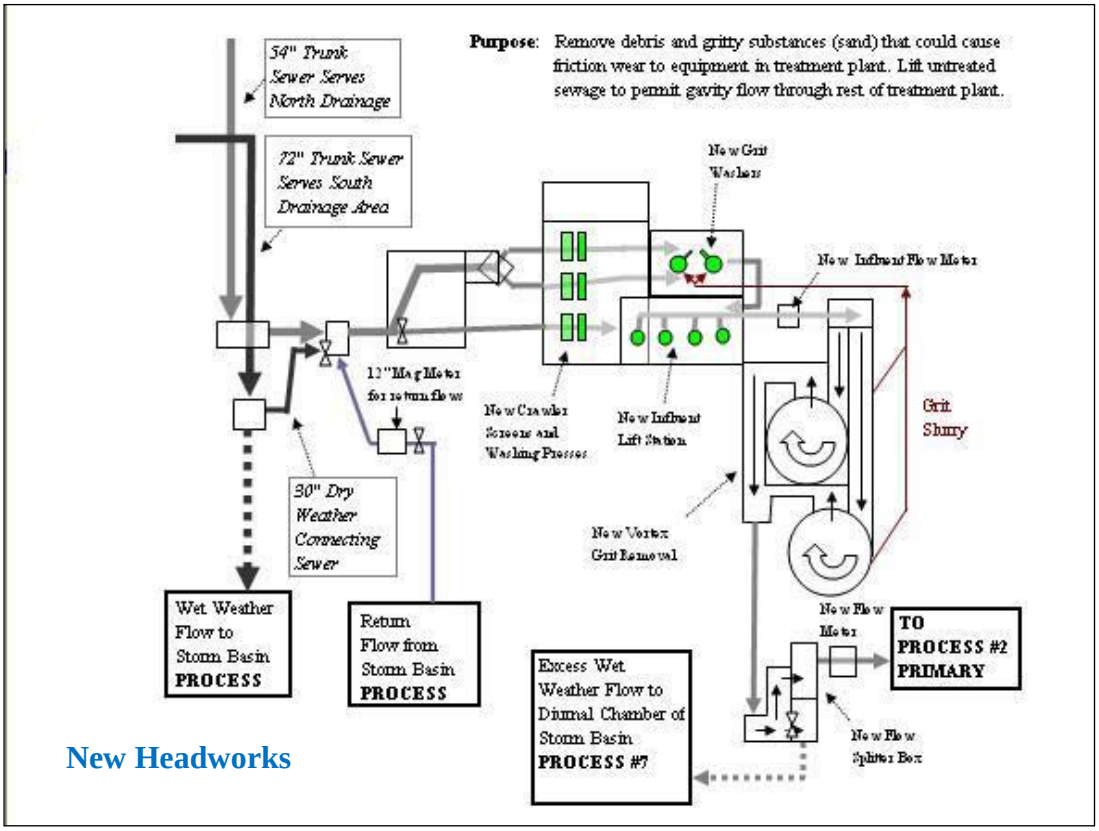


Table 5-1

Improvement:	**Old Headworks**	**New Headworks**
Screenings	There were three electric motor driven catenary bar screens with continuous rakes on chains and 3/4 inch bar spacing. Two were rated at 10MGD and used in dry weather. The third was rated at 45 MGD and used for wet weather flows. Screenings discharged to a conveyor belt that transported the wet screenings into a 20 yard box for disposal at a landfill.	There are three hydraulic driven crawler screens with 5/8 inch bar spacing. Each bar screen is rated at 15 MGD. Two are used in dry weather and the third is used for wet weather flows. Additionally, each bar screen discharges to a screenings press that washes the material and compresses the washed screenings into a cake, reducing the water content substantially. Washed screening are discharged into 90 gallon refuse containers and ultimately picked up as municipal solid waste by the MC Refuse Dept.
Grit Removal	Sand and other inert material was removed in two channels with flow proportional weirs and a third, aerated grit chamber for storm flows. The material was placed on a conveyor belt by continuous chain and bucket mechanisms. The conveyor transported the wet grit to the same 20 yard box, commingling with the screenings. Final disposal was in a landfill.	Sand and other inert material settles in the sumps of two 30 MGD vortex grit removal tanks. Periodically the grit slurry is pumped to two vortex grit washers that separate the grit from the slurry and use a screw conveyor to dry the grit and discharge it into 90 gallon refuse containers. The containers are dumped into a 3.9 yard trailer, which is used to transport the grit to the sludge storage area. Semiannually, grit is land applied with dewatered sludge.
Influent Pumps	Wastewater was lifted to the primary clarifiers by one 15 MGD horizontal centrifugal pump. Two other 15 MGD pumps were used to divert excess flow to the diurnal storm basin. Only one of the two other pumps could be used for treatment plant flows. Two pumps were variable speed controlled by an electrolyte driven speed control system using wet well level and flow rate. During storms, the flow through the treatment plant ranged from 12 to 13.5 MGD.	Four VFD-driven vertical turbine pumps lift the screened wastewater to the vortex grit removal tanks. Each pump is rated at 15 MGD and the pump discharge rate is determined by wet well level as measured by a pressure transducer. All flows into the treatment plant are screened and receive grit removal prior to diversion, if required, to the diurnal storm basin [SEE FLOW CONTROL]
Flow Control; two trunk sewers feed the treatment plant: a 54-inch sewer and a 72-inch sewer	Dry Weather: all flows from the 54-inch sewer passed through the two smaller bar screens. All flow in the 72 inch sewer entered the 54-inch sewer by a 30-inch connecting pipe. Light Wet Weather: Flows entered treatment plant in same manner, but as wet well level reached a set point, the speed controller was taken over by an automatic gain control module, which strived to maintain a constant discharge flow rate ranging from 12 to 13.5 MGD. Excess flows were diverted to the diurnal storm basin by the second and/or third pump.	Dry Weather: all flows from the 54-inch sewer pass through bar screens 1 & 2. All flow in the 72 inch sewer enters the 54-inch sewer by a 30-inch connecting pipe. Light Wet Weather: All flows enter treatment plant in same manner and after passing through the vortex grit tanks flow to a new primary splitter box. Flow to the primary clarifiers is measured at this box and when that flow exceeds 15 MGD, a step modulated slide gate opens incrementally to maintain 15 MGD to the primary clarifiers. The gate is controlled by a programmable logic controller (PLC), which modulates the gate until the influent flow drops below 14 MGD.

Table 5-1 (continued)

Improvement:	**Old Headworks**	**New Headworks**
Flow Control (continued)	Moderate to Severe Storms: as wet weather flows increased, the level in the 54-inch sewer would rise and overflow a weir to the third bar screen and aerated grit chamber, but not until the 54-inch sewer was surcharged (full). Flows to the treatment plant were limited by charging a pneumatic pinch valve that could partially or completely close the connection between the 72 and 54-inch sewers, thereby diverting all flow in the 72 inch sewer to the center storm basin. If the level continued to rise in the 54, eventually an overflow weir would divert untreated sewage to Trail Creek.	Moderate to Severe Storms: To prevent surcharging of the 54-inch sewer, the weir to the storm screen was removed and the wall was cut to the floor and a slide gate was installed. When the influent flow rate reaches 18 MGD OR the level differential between up and downstream of either bar screen exceeds 2 feet, the slide gate for the third bar screen automatically opens until the flow rate drops below 18 MGD. If the flow rate increases to 30 MGD or more, a modulating slide gate, which replaces the 30-inch pinch valve, closes incrementally to maintain the influent flow at 30 MGD. When that gate is partially or fully closed, a portion or all of the flow in the 72-inch sewer is diverted to the center storm basin. Both of the slide gates are controlled by the PLC.
	Semiautomatic control by flow rate and level for diurnal diversion, and manual control for 72-inch diversion.	Fully automatic flow control through PLC.
Main Switchgear	Two banks of switchgear with an automatic transfer switch from primary to secondary feed. Auto transfer switch could only be used manually. Equipment was over 20 years old.	Two banks of switchgear with a functioning automatic transfer switch from primary to secondary feed. Reliability of new equipment permitted the removal of the emergency plant bypass overflow weir.

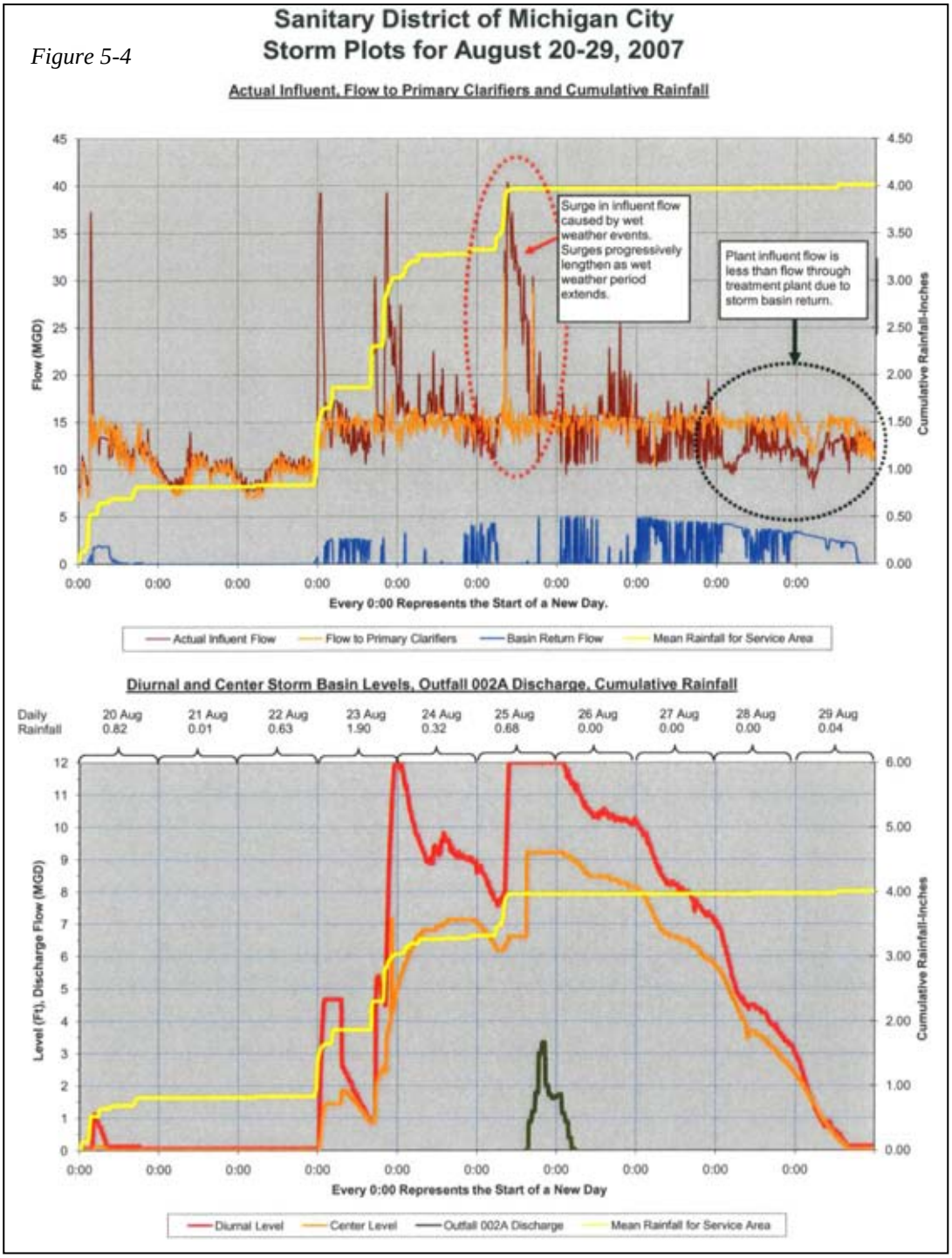
The main advantages of the new headworks are reliability in equipment and power; automatic flow control, with redundant control sensors; elimination of artificial backups in the 54-inch trunk sewer that were created by the hydraulic design of the old headworks; and maximization of flows through the treatment plant prior to diversion to the storm water basins.

As stated, as a result of the new bar screens and removal of overflow weirs at the end of the old grit channels and prior to the storm bar screen, the normal level of wastewater in the 54-inch trunk sewer dropped significantly. This created two opportunities: first, the ability to determine if a diurnal pattern exists at the treatment plant for dry weather periods; and second, if said pattern exists, to use the diurnal pattern to assist in evaluating the potential impact of wet weather events.

One of the nine minimum technology-based controls requires flow maximization through the wastewater treatment plant. As discussed previously, the treatment plant has an average daily design flow of 12 MGD and a peak hourly design flow of 15 MGD. The 2006 modification to the Sanitary District's NPDES permit requires maximization of flows prior to

(or concurrent with) the diversion to the storm retention basins. The new headworks were designed to maximize flows through the treatment processes at the peak hourly design flow capacity. This is done automatically through a programmable logic controller (PLC) which reads the flow meter for the influent lift station and the flow measurement for the primary clarifier influent and adjusts modulating gates to maintain the average flow to the primary clarifiers at 15 MGD whenever the influent lift station flow exceeds that for rate. Figure 5.4 clearly shows that modulating gates maintain an average of 15 MGD during storm events and while the stored flow in the Storm Retention Basins are returned to the treatment plant headworks.

Figure 5-4



5.8.2 Treatment Efficiencies

As a result of maximization, the flow through the treatment plant exceeds the average daily design flow for extended periods. Therefore wet weather events potentially have an impact on treatment efficiency. The following table summarizes the treatment capacity of each of the treatment stages.

Table 5-2

TREATMENT UNIT	"Ten States" STANDARD[1]	STANDARD VALUE	MCSD VALUE	MAXIMUM FLOW FOR UNIT PER STANDARD (MGD)
Climber Bar Screens				35.0
Pista Grit Channels				60.0
Influent Lift Pump				45.0
Primary Clarifiers	Surface overflow rate (SOR) @design flow tanks not receiving activated sludge gpd/sq ft	1,000	1,423	**8.4**
	SOR @design peak hourly flow tanks not receiving activated sludge	1,500	1,779	**12.7**
	SOR @design peak hourly flow tanks receiving activated sludge	1,200	1,779	**10.1**
Aeration Tanks	Organic Loading for extended aeration – single stage nitrification lbs BOD/d/1000 cu ft	15	**13 @ 7.7 MGD** **20 @ 12 MGD** **25 @ 15 MGD**	**14.0**
	F/M Ratio Lb BOD/d/lb MLVSS	0.05 – 0.1	0.055	
	MLSS (mg/l)	3,000 – 5,000	3,556	
Secondary Clarifiers	Extended aeration – single stage nitrification SOR gpd/sq ft	1,000		19.0
	Activated sludge w/chemical addition for phosphorus removal	900		17.1
Tertiary Sand Filters	Hydraulic loading gpm/sq ft	2.5-5.0 [1]	3.2 @12 MGD 3.9 @15 MGD	19.0 SOLIDS DEPENDENT

[1] Manufacturer's criteria.

Flows to the primary clarifiers that exceed 8 MGD also exceed the design capacity flow for that treatment unit. The secondary treatment unit has some excess capacity and therefore, can absorb the effects of less efficient primary treatment. One might expect the secondary and tertiary treatment stages to be strained under these conditions. However, the following Table 5-3 summarizes the treatment efficiencies for total suspended solids (TSS), biological oxygen demand (BOD5), ammonia as nitrogen, and total phosphorus for January 2006 through December 2008.

[1] Recommended Standards for Wastewater Facilities, 1997 Ed., Great Lakes-Upper Mississippi Board of State and Provincial Public Health Environmental Managers, Health Education Services, Albany, NY.

Table 5-3

Flow to Primary Clarifiers	<8 MGD		8-12 MGD		>12 MGD	
	MASS Lbs/Day	% Removal	MASS Lbs/Day	% Removal	MASS Lbs/Day	% Removal
TSS						
Influent	6,724		7,150		10,152	
Primary Effluent	2,945	56%	4,106	43%	5,085	50%
Secondary Eff.	330	39%	547	50%	940	41%
Final Effluent	151	3%	220	5%	428	5%
Overall Removal		98%		97%		96%
BOD5						
Influent	7,316		7,018		7,698	
Primary Effluent	4,288	41%	4,834	31%	5,210	32%
Secondary Eff.						
Final Effluent	142	57%	192	66%	53	64%
Overall Removal		98%		97%		96%
Ammonia-N						
Influent	805		791		776	
Primary Effluent	765	5%	846	-7%	859	-11%
Secondary Eff.	14	93%	12	105%	18	108%
Final Effluent	8	1%	9	0%	14	1%
Overall Removal		99%		99%		98%
Total Phosphorus						
Influent	185		185		212	
Primary Effluent	134	27%	157	15%	165	22%
Secondary Eff.	35	53%	42	62%	60	50%
Final Effluent	36	-1%	37	3%	51	4%
Overall Removal		80%		80%		76%

Clearly, the secondary and tertiary stages have been able to provide consistent treatment for elevated flows through the plant.

5.8.3 Storm Retention Basin

5.8.3.1 Storm Basin Performance

When the influent lift station flow exceeds 15 MGD, but is less that 30 MGD, diversions to the storm retention basins occur at the new primary splitter box via PLC modulated gate valves. Those diversions are sent to the Diurnal Basin (see Figure 5.3).

When the influent lift station flow exceeds 30 MGD, then a gate on the 30-inch sewer connects the 72-inch trunk sewer with the 54-inch trunk sewer will modulate to limit the flow through the influent lift station to 30 MGD. Flows diverted by the closing or partial closure of that gate, will be sent to the storm water control building for screening and discharge to Storm Basin #1.

When the diurnal basin reaches capacity, it will overflow into Storm Basin #1. Similarly, when Basin #1 reaches capacity, it will overflow into Storm Basin #2.

When the wastewater level in the diurnal basin covers the aeration header, the shift operator will manually turn on the blower to the diurnal basin. Similarly, the blowers for the aeration headers in Storm Basin #1 and #2 are turned on when the wastewater level in the respective basin covers the header. If the level in storm Basin #2 reaches within one foot of the discharge weir to the disinfection chamber, then the operator will turn off the blower for Storm Basin #2 and permit that basin to act as a settling chamber.

Once the storms have ended, and the plant influent pump station flow drops to 14 MGD, a modulating plug valve on the 12-inch return opens to permit automatic drainage of the storm basins to the plant headworks. The valve step modulates to maintain the influent pump station flow at 14 MGD. If that flow rate increases above that set point, the valve will close and the PLC will monitor the flow rate until it drops below the set point.

5.8.3.2 Overflow Occurrences

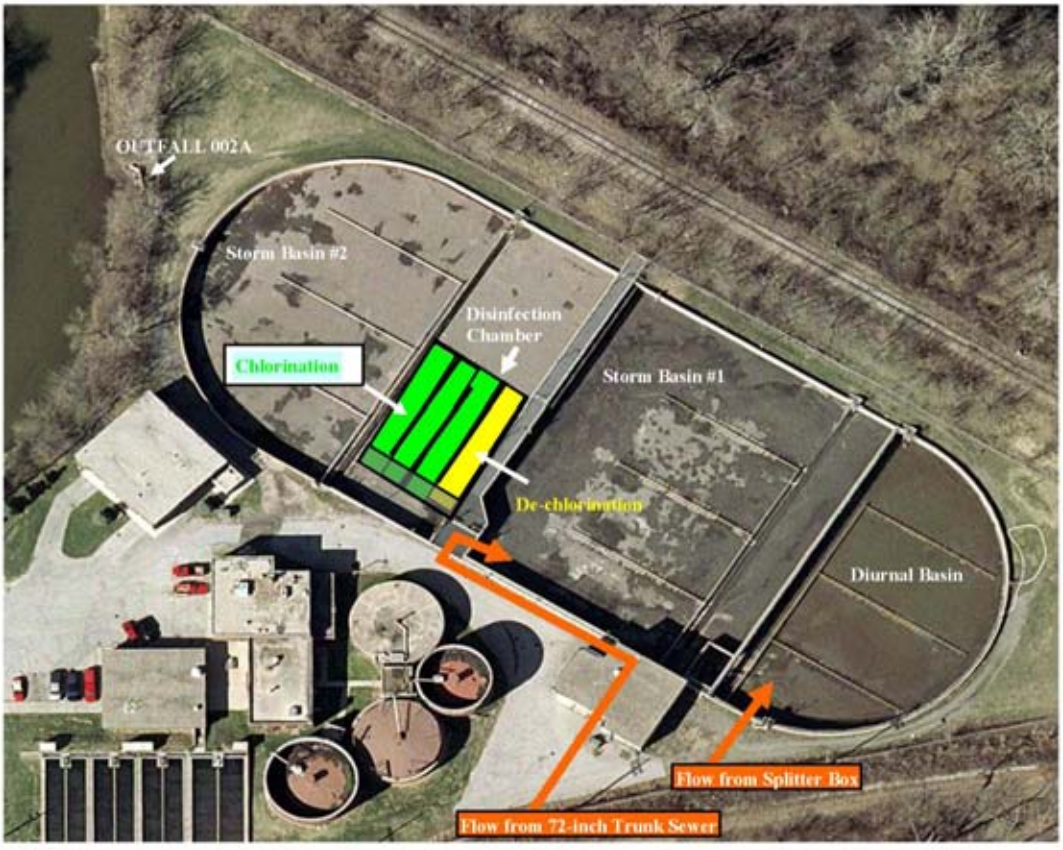
When Storm Basin #2 reaches the overflow weir to the disinfection chamber, the chamber fills and the wastewater overflows into a rectangular channel leading to a 96-inch diameter discharge pipe to Trail Creek. APPENDIX N lists the wet weather events for 2006 through 2007 that resulted in a significant use of the storm basins and/or a discharge from Outfall 002A. Of the fifty-two (52) significant events, only six (6) resulted in a CSO discharge. Note that the time required to empty the storm basins from the end of the storm varies widely over these events.

5.8.3.3 Disinfection of Discharge

The Sanitary District agreed to construct a disinfection chamber for Storm Basin #2 and the discharge through Outfall 002A, see Figure 5.5. The basin was designed to disinfect a maximum flow of 10 MGD for discharges of secondary treatment quality or 5 MGD for untreated wastewater. Disinfection is required for discharges from April 1st through October 31st. The disinfection chamber can hold 0.118 million gallons and flow is measured as the wastewater enters the disinfection chamber.

Figure 5-5

Storm Basin Disinfection
Annotated Aerial View



When the disinfection chamber was constructed, the flow meter range was calibrated from 0 to 114 MGD. Therefore, since dry weather discharges from the storm basin are prohibited, each discharge event became a means for adjusting the disinfection system. These adjustments were made based on results of the previous storm:

Storm #1 07/27/2006 - First storm with disinfection: chlorinator started just before discharge from chamber, chlorinator set to 300 lbs/day due to flow range.

Storm #2 09/13/2006 - Chlorinator started as soon as wastewater entered disinfection chamber; chlorinator set to 300 lbs/day.

Storm #3 04/25/2007 – Disinfection drain valves opened to equalize level with rest of Basin #2; chlorinator started when wastewater rose to within 1 foot of overflow weirs to disinfection chamber; chlorinator set to 300 lbs/day.

Storm #4 08/25/2007 – same procedure as with Storm #3; failed to adequately disinfect; had flow meter manufacturer in to recalibrate range to 0-25 MGD.

Storm #5 01/7/2008 – no disinfection required; ran system in automatic feed mode with newly calibrated flow meter; system set to initial feed rate of 350 lbs/day.

Storm #6 01/10/2008 – No disinfection required; had annual system check in March 2008 and set up chlorine and sulfur dioxide feed for dual tanks in order to increase dosage during next storm.

Storm #7: 09/13/2008 – 100 year storm, disinfection added with little success in meeting limitation (235). Positions of chlorine and sulfur dioxide diffusers were examined. Current positioning reduces chlorine detention time by 1/3 of design flow.

Storm#8: 12/28/2008 – no disinfection required. System examined by contractor, recommendations made for moving chlorine and sulfur dioxide diffusers to increase detention time for chlorine. Changes scheduled for 2009.

5.8.3.4 Monitoring Protocol

Storm basin influent flows are monitored in two places: the Primary Splitter Box Diversion and the 72-inch trunk sewer as it enters the Storm Basin Control Building. The former is measured by the difference between the plant influent pump station flow (48-inch magnetic flow meter) and the flow to the primary clarifiers (rectangular weir). The latter is measured by a velocity-cross section area meter. Return flow from the storm basins is measured by a 12-inch magnetic flow meter. Outfall 002A discharge flows are measured by a V-notch weir (0-5 MGD) and a rectangular weir (5-25 MGD) minus the volume of the disinfection chamber for the initial discharge date.

Actual plant influent flow is the sum of the 48-inch magnetic flow meter, the 12-inch storm return magnetic flow meter, and the 72-inch velocity-cross sectional area flow meter. Flows to the WWTP for treatment are measured by the rectangular weir at Primary Splitter Box.

Sampling requirements and frequency for the treatment plant are found in Table 2.5. All samples for Outfall 002A are grab samples once per day in accordance with Attachment A of the 2006 NPDES Permit Modification. Table 2.5 also contains NPDES Permit limits for plant effluent (Outfall 001B) and storm basin outfall (002A).

5.8.3.4.1 Data

Samples for Outfall 002A are taken within two hours after discharge begins. E. coli and chlorine residual samples are taken from April 1st through October 31st at two locations: immediately before the discharge from the disinfection chamber, and at the end of the rectangular channel just before the discharge flow enters the 96-inch diameter discharge pipe to Trail Creek. The former is for operational control and the latter is for NPDES Permit monitoring. All other permit parameters are sampled at the latter location. Samples for the second, third, etc day of discharge are taken during the normal day-shift (7:00 am to 3:00 pm) in the morning. Dissolved oxygen data is collected in the field with a YSI dissolved oxygen meter. All samples are held and preserved in accordance with 40 CFR Part 136.

APPENDIX O contains the data collected for Outfall 002A discharges from 2000 through 2008.

5.8.3.4.2 Observation and Reporting of Adverse Effects

All data for Outfall 002A are reported to the Indiana Department of Environmental Management monthly. All data within Table 9.2 meets acute water quality criteria for protection of Aquatic Life. Some the E. coli data exceeds the daily maximum limitation for protection of Full-Body Contact Recreation in Trail Creek. Efforts to bring the E. coli data into compliance are discussed in Section 5.8.3.3.

5.8.3.4.3 Public Notification

The public is notified at the earliest Sanitary District Board of Commissioners meeting and at the next scheduled meeting. A representative of the local newspaper is generally present at the meeting. Board meetings are recorded and available to the public at the following web site: http://www.alco.org/alcotv.html

5.8.3.4.4 Signage

As seen in this photograph, signage at Outfall 002A identifies the discharge as a CSO outfall.

5.8.3.4.5 Public Hearings

No public meetings have been held between 2000 and 2008 for CSO issues.

6 Schedule of Activities

6.1 Staffing

The Sanitary District staffing levels are considered adequate for completing the District's mission. Specifically, the current staffing level is adequate for completing the tasks required by the CSOOP.

6.2 Collection System

The Sanitary District has two goals for sewer maintenance activities:

A. Section 2.2.4 states all manholes and catch basins will be cleaned as needed; based on review of data, problem areas will be cleaned more frequently. Section 4.5 states that all sewers are flushed in a two year period; and,

B. Current practice is to clean and /or inspect, for preventive maintenance, all sewers every three years. The current goal for manholes and catch basins is to conduct inspection on a 10 year cycle, or 20 miles per year.

In addition, areas within the Sanitary District establish annual goals. For 2008, the annual goals for the Collection System Area were:

1. 2008-CS-01: Improve service to our customers by reducing the number of line blockages that occur within our public sewers. Reduce the overall annual number of line blockages by 10% from 2007 to 2008 through focused attention on target areas.

   In 2007 the number of District plugs was 68. In 2008 the District attained a reduction of 22% with 53 District plugs.

2. 2008-CS-02: Document the existing condition of our sanitary sewer system through video inspection methods. Inspect 20 miles of our sanitary sewers through video inspection methods in 2008. This represents approximately 10% of our sanitary sewer network.

   In 2008 we were able to video 6.5 miles of sanitary sewer. It is anticipated that this number will increase with additional trained personnel.

3. 2008-CS-03: Document the existing condition of our sanitary sewer system though manhole inspection methods. Inspect 20% of our sanitary sewer manholes through visual inspection methods.

   In 2008 our stated goal was modified to provide a better database to accomplish the original goal. In 2008 the District GPS-mapped nearly 70% of our sanitary sewers which will facilitate a methodical and more accurate total inspection. In 2008 the District trained its manhole inspection team in a standardized (MACP) inspection program. The original goal will resume in 2009.

4. 2008-CS-04: Determine and reduce the Inflow and Infiltration (I/I) into the sewer systems discharging into Clark Lift Station and the Freyer Road Lift Station. Reduce wet weather flow into the Clark Lift Station and Freyer Road Lift Station by 50%.

   The inspection of the Clark Lift Station system for I/I issues is ongoing as inspection in 2008 found no apparent gross I/I locations.

   The Freyer Road Lift Station I/I was reduced from a 2007 average daily flow of 102,849 gallons, based on a 2007 rainfall of 37 inches, to a 2008 average daily flow of 59,369 gallons, based on a 2008 rainfall of 25 inches. This was accomplished by raising three manhole castings and the insertion of plastic ring barriers.

6.3 Infiltration and Inflow Control Projects

As stated in section 6.2, 2008-CS-04, I/I problems at Clark Lift Station and Freyer Road Lift Station were a priority for 2008. Future I/I Control Projects are dependent on impact and available funding.

6.4 Lift Station Upgrades

As indicated on the Lift Station Status Report, APPENDIX F, several lift stations need rehabilitation and/or relocation. The Sanitary District addresses these as part of financial planning. Henry Street lift station was included in the current planning period along with the construction of the new Lake Hills Lift Station, formerly Washington Park Boulevard Lift Station.

Currently, engineering for pump upgrades to Kimball Woods and Beachwalk Lift Stations are ongoing. Seven lift stations are scheduled for conversion from AT&T simple alarm status monitoring to real-time monitoring through Mission telemetry.

6.5 Treatment Plant Upgrades

Although the existing capacity of the treatment plant is adequate for flow maximization, Sections 3.6 and 5.8, anticipated future flows, Laporte County Master Planning, and age of existing plant led to the development of a Master Planning Study by McMahon and Associates, Inc., in 2007 for the next 20-year planning cycle. That study is under review by District staff and should be presented to the Sanitary District Board of Commissioners for their approval in 2008.

Under the proposed plan, the average daily design flow would remain at 12 MGD, but the peak hourly design would increase from 15 MGD to 18 MGD. This increase would permit higher flows through the treatment plant during wet weather and potentially reduce or eliminate discharges from the Strom Basins (NPDES Permit Outfall 002A). The increase in peak flow would be accomplished by converting existing secondary clarifiers to new primary clarifiers; replacing the existing single-stage nitrification aeration system with aerated biological filters; replacing the existing shallow-bed sand filters with disc filters; switching from chlorine/dechlorination to UV disinfection; and converting three existing aeration tanks to aerobic digesters. The proposed plan will permit the doubling of the average daily design flow in the future, without any need for additional land. That study was presented to the Sanitary District Board of Commissioners in 2008 and preliminary engineering studies are ongoing.

APPENDIX A

Guide to Approved CSOOP and 1994 Modification

Since the approved CSOOP is over 14 years old, significant changes in the Sanitary District's collection system have occurred. This warrants the submittal of the actual revised CSOOP, with this document as a guide to where changes were made in past versions of the Combined Sewer Overflow Operational Plan (CSOOP). This document is merely a tool to facilitate the identification of the revisions to the April 18, 1994 approved CSOOP as submitted to the Indiana Department of Environmental Management in accordance with NPDES Permit IN 0023752, Attachment A.

This document's format is based on the January 1990 Submittal, February 1994 and July 1996 Revisions. Proposed revisions are in ***bold italic***, deletions are in ~~strikethrough~~.

1. Introduction

The following timeline summarizes the efforts made by Michigan City to comply with various State of Indiana and Federal combined sewer system controls and requirements

January 1990**.....*****The Sanitary District of Michigan City (SDMC) submitted its original Combined Sewer System Operational Plan (CSSOP) to the Indiana Department of Environmental Management (IDEM)***

February 1994**.....*****SDMC submitted a revision of the CSSOP in response to comments from IDEM in June 1992 (Revision 1)***

April 1994**.....*****IDEM approved the CSSOP as the CSOOP***

May 1996 **.....*****IDEM released Indiana's Final Combined Sewer Overflow Strategy, through the Indiana Register, which was written in accordance with the U.S. EPA's 1994 National CSO Control Policy.***

June 1996**.....*****IDEM requested that SDMC submit a revision to the approved CSOOP that addressed the three new minimum technology-based controls: pollution prevention; public notification; and monitoring to characterize CSO impacts and efficacy of controls. IDEM also requested that SDMC submit a Stream Reach Characterization and Evaluation Report (SRCER) in accordance with the date established in the upcoming NPDES renewal/modification.***

July 1996**.....*****SDMC submitted revision of the CSOOP to address the three new minimum controls; update select portions of the approved plan; and included a CSO monitoring protocol for completing the SRCER. (Revision 2)***

November 1997**.....*****IDEM approved a modification to SDMC's NPDES permit that required the submittal of the SRCER to IDEM no later than eighteen (18) months after approval of the CSO monitoring protocol. In addition, SDMC was required to submit a Long-Term Control Plan (LTCP) for combined sewer overflows to IDEM no later than 12 month after the submittal of the SRCER.***

September 2000**.....*****SDMC submitted the completed SRCER***

April 2002**.....*****SDMC submitted LTCP (after approved extension to due date)***

November 2003**.....*****SDMC responded to IDEM review of LTCP***

December 2003**.....*****SDMC responded to final IDEM review of LTCP***

April 2004**.....*****IDEM approved LTCP, pending modification of NPDES permit***

January 2006**.....*****IDEM approved modification of NPDES permit including final approval of LTCP and requirement to update CSOOP annually, starting 12 months after effective date of permit modification (February 13, 2006)***

[This change replaces Section 1.0, page 1-1 in the 1990 submittal]

1.1 Scope

This document is written to provide the ***Sanitary District*** of Michigan City with a Combined Sewer ~~System~~ ***Overflow*** Operational Plan (CSOOP). This plan is written to include mechanisms and specific procedures to ensure that ***the nine minimum technology-based controls for combined sewer overflows are followed and activities are properly documented***. ***The nine minimum controls include:***

- ***Proper operation and regular maintenance;***
- ***Maximum use of the collection system for storage;***
- ***Review and modification of pretreatment programs;***
- ***Maximization of flow to the POTW for treatment;***
- ***Prohibition of CSO discharges during dry weather;***
- ***Control of solid and floatable materials in CSO discharges***
- ***Pollution prevention programs;***
- ***Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and***
- ***Monitoring to effectively characterize CSO impacts, and the efficacy of CSO controls.***

[This change replaces Section 1.1, page 1-1 in the 1990 submittal]

1.2 Operational Plan

This Combined Sewer ~~System~~ ***Overflow*** Operational Plan shall be divided into ***the following*** chapters: ~~The chapters shall be:~~

Chapter 1 Introduction
Chapter 2 Combined Sewer System Inventory
Chapter 3 Administrative Aspects
Chapter 4 Source Controls
Chapter 5 Sewer System Controls
Chapter 6 Treatment Plant Options
Chapter 7 Models for Combined Sewers
Chapter 8 Regular Maintenance Program
Chapter 9 Control Strategy
Chapter 10 Schedule of Activities

[This change replaces Section 1.2, page 1-1 in the 1990 submittal]

1.3 Combined Sewer System

~~A combined sewer is defined as a sewer that is both a sanitary sewer and a storm sewer. In other words, it carries in a single conduit both domestic wastes and storm water runoffs.~~

~~One of the most important components of a combined sewer system is the intercepting sewer. Large sewer systems, such as Michigan City's, have a large network of intercepting sewers. The excess volume of an intercepting sewer is not constant but varies depending on the volume of dry weather sanitary sewage flow. Another important component in a combined sewer system is the regulator. Regulators in the sewers channel dry weather flows into the intercepting sewers and thence to the wastewater treatment facility. They also protect the wastewater treatment facility from overloading and sewer system from backups whenever the flows become excessive during a storm by allowing overflows to the receiving waters. This component is the weakest element in the combined sewer system.~~

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to receiving waters.

[This change replaces the text in section 1.3, page 1-1 in the 1990 submittal.]

1.4 Problems Associated with Combined Sewer Systems

These overflows, called combined sewer overflows (CSOs), contain not only storm water but also untreated human, commercial, and/or industrial waste, potentially toxic materials, and debris. They are a major water pollution concern for the approximately 772 cities in the U.S. that have combined sewer systems.

[This change replaces the text in section 1.4, page 1-2 in the 1990 submittal.]

1.5 Combined Sewer Overflow Controls

Technologies exist to control pollution from combined sewer overflows and storm water runoff. They can be grouped into three main categories. A brief discussion of each category follows:

1) SOURCE CONTROLS includes those measures for reducing pollution from combined sewer overflow and storm water which involves actions within the urban drainage basin before urban water reaches the sewer system, and affecting the quantity and quality of the aforementioned pollution. ~~Examples include surface flow attenuation, use of porous pavement, pretreatment, improved sanitation practices (street cleaning), catch basin cleaning, and sewer line flushing.~~
2) COLLECTION SYSTEM CONTROLS are intended to insure that the combined sewer system operates as efficiently as possible and that maximum advantage is taken of opportunities to reduce combined sewer overflows. ~~Some control examples are the use of~~

~~regulator devices, infiltration/inflow control, use of polymer (friction reducing) flow additives, in-line storage and sewer separation.~~

3) TREATMENT CONTROL removes pollutants from combine sewer flows. ~~Off-line storage (earthen basins and concrete basins) and wastewater treatment facilities utilizing primary treatment of excess flows and high grade granular filtration are examples.~~

The following chart summaries how the nine minimum technology-based controls and the three main categories interrelate.

Nine Minimum Technology-Based Controls	*Source Control*	*Collection System Control*	*Treatment Plant Control*
Proper operation and maintenance of collection system		***X***	
Maximum use of collection system for storage		***X***	
Review and modification of pretreatment programs	***X***		
Maximization of flow to POTW for treatment		***X***	***X***
Prohibition of CSO discharges during dry weather		***X***	***X***
Control of solid and floatable materials in CSO discharges		***X***	***X***
Pollution prevention programs	***X***		
Public notification to ensure that public receives adequate notification of CSO occurrences and CSO impacts	***X***		
Monitoring to effectively characterize CSO impacts, and efficacy of CSO controls		***X***	***X***

[This change replaces the text in section 1.4, page 1-2 in the 1990 submittal.]

2.0 Combined Sewer System Inventory

2.1 Project Area – Physical Conditions

2.1.1 Geographical

The ***Sanitary District of*** Michigan City service area is located in northwest LaPorte County, Indiana and is generally bounded on the north by Lake Michigan, on the east by I-94 ~~US Highway 212~~, on the south by LaPorte County Road 400 North and on the west by the LaPorte-Porter County Line Road. ~~This area includes portions of Township 38N, Range 4W and Township 37N, Range 4W.~~ Figure 2-1 shows the ***general boundaries of the*** geographical ***service area***.

[This change replaces the text in section 2.11, page 2-1, and Figure 2-1 in the 1990 submittal.]

2.1.2 Geological *[No changes]*
2.1.3 Topographical *[No changes]*
2.1.4 Hydrological *[No changes]*

2.2 Sewer System

2.2.1 Physical Condition

The Michigan City Sanitary District previously completed sewer rehabilitation through the Federal PL92-500 Program. ***During t***his rehabilitation of sewers, ~~sewer lined~~ bad portions of the system ***were lined***. ~~This~~ ***That*** rehabilitation ***project*** was the result from an Infiltration/Inflow Analysis and Sewer System Evaluation Survey. ~~The existing system is in good to very good condition. The oldest parts of the system, where were installed in the 1930's, were predominantly abandoned and rebuilt in the past few years.~~ **[INSERT "A"]**

Currently, there are four areas of the collection system that need rehabilitation or replacement:

A. Greenwood Avenue between Carroll Avenue and Cleveland Avenue.
B. Ohio Street at US Highway 20 crossing.
C. Spring Street, both sides, between 11th Street and 6th Street.
D. Cedar Street, both sides, between 11th Street and 6th Street.

These areas will be scheduled on a priority basis dependent upon the severity and available funding.

~~Figure 2-2 shows the~~ ***A plot showing remaining portions of the current service area containing*** combined sewers ***is in Appendix B*** ~~in Michigan City~~.

[February 8, 1994 responses to IDEM comments] IDEM: The Plan map should include the location of catch basins. MCSD: ~~The Michigan City Sanitary District presently does not have a map with the catch basins located on it. The MCSD will start a study to locate the catch basins. The MCSD will be hiring a staff engineer, in the near future, which will assist in this work.~~ ***The District is currently building the primary GIS layer of sanitary sewer manholes. Initial data acquisition for approximately 50% of the system has been completed. As this data are overlaid on a base map, another pass will be made to televise/inspect the manholes; obtain inlet and outlet sizes and directions; and televise/inspect the inlet and outlet piping. In the combined sewer areas this will include catch basin mapping. An enumeration of catch basins at street intersections is available; however, it has not been evaluated for completeness or relationship to the combined sewer areas. The list of catch basins will be compared to the map of combined sewer areas and the number of catch basins will be noted on the map.*** Field personnel know the location of all catch basins, but the information must be put on a map.

Manholes in Michigan City are in good condition. Bad manholes, when located, are grouted to prevent infiltration. ***Also, during storm water separation and street reconstruction projects bad manholes are replaced with new pre-cast concrete manholes.***

The lift stations in Michigan City are ~~in the process of being~~ rehabilitated ***or relocated as needed***. ~~The process has been ongoing for the past 3 years and approximately 2/3 of the lift stations have been rehabilitated to date.~~ ***In 2001, the Sanitary District adopted a Standard Lift Station Design, which has been used for new or relocated lift stations since adoption. New or relocated lift stations in remote or critical areas are equipped with a natural gas-fueled permanent on-site generator. All lift stations are currently being converted from land-line based telephone alarm monitoring, which simply provides alarm condition – no alarm condition status, to real time remote telemetry units (RTUs) with digital and analog inputs that permit equipment specific monitoring. The conversion to the data cellular communication system is entering its fourth of five years and is approximately 65% complete. Using an extra analog input at four lift stations has permitted the Sanitary District to divide the service area into quadrants and measure real-time rainfall in 0.01 inch increments.***

[This change replaces the text in section 2.2.1, page 2-3, and Figure 2-2 in the 1990 submittal.]

2.2.2 Age, Length, Materials, Sizes, and Depths of Sewers

The oldest sewers in Michigan City are approximately 60 years old. The average age of the sewers in Michigan City is 30 years old. Sewers in Michigan City are made of vitrified clay, concrete, and reinforced concrete. The City is presently experimenting with PVC sewers for the first time. Sewers in Michigan City are between 4 and 35 feet deep with an average depth of 15 feet. See ~~Table 2-1~~ ***Appendix C*** for pipe sizes and corresponding lengths in Michigan City.

[This change replaces the text in section 2.2.2, page 2-4, and Table 2-1 in the 1990 submittal.]

2.2.3 Sewer Separation

Since 1962, the ***Sanitary District of*** Michigan City Sanitary District has been actively separating the sewers in Michigan City. The ***Sanitary*** District has spent over ~~$30,000,000~~ **[WHAT IS THE CURRENT TOTAL?]** separating their combined sewers and are approximately ~~50%~~ ***90.7%*** **[THIS IS THE NUMBER USED IN THE LTCP, IS IT STILL CORRECT?]** complete in the sewer separation program. The ***Sanitary*** District plans to continue their projects and ~~are~~ ***is presently in the planning phase for the Lafayette-Barker combined sewer area***. It is the ***Sanitary*** District's belief that the best way to eliminate combined sewer overflows or basement flooding is to eliminate the source. Therefore, the District has continuously been planning, designing or constructing projects to eliminate combined sewer overflows since 1962. The treatment plant was designed in the mid ***19***60's for a***n average design*** flow of 12 MGD. The current plant ~~is~~ also ***has an average*** design~~ed for~~ flow of 12 MGD and has ***an average*** ~~approximately 9 MGD coming to the plant~~ daily ***flow of 8.81 MGD***. ~~The flows to the plant have been reduced after each sewer projects by eliminating infiltration.~~ The ***Sanitary*** District feels that sewer separation projects***, along with Infiltration/Inflow control,*** not only eliminate overflows but also gives the plant added capacity.

[This change replaces the text in section 2.2.3, page 2-4 in the 1990 submittal.]

2.2.4 Maintenance Practices and Problems

The ***Sanitary District of*** Michigan City ~~Sanitary District~~ has ***recently developed*** a manhole~~ and catch basin~~ ***inspection*** ~~cleaning program~~ ***standard operating procedure (SOP PM.2, see Appendix D)*** to ensure that each ~~catch basin and~~ manhole is ***inspected and*** cleaned***, as required. Current manhole inspection planning efforts anticipate inspecting the manholes associated with 20 miles of sewer per year and completing all manhole inspections over a 10 year period.*** ~~once a year~~ ***The inspections will be conducted by District employees using the District's Trimble GPS equipment and EnviroSite pole camera, with observations recorded in an inspection database questionnaire to ensure data consistency. The data will be kept in the GIS database on District servers maintained by the District's IT Department. The IT Department does a regular back up of the data. The data will be available on District servers and access may depend on software licensing and hardware requirements.***

Catch basins in remaining combined sewer areas are inspected and cleaned as necessary under the same inspection program. Certain special catch basins, approximately 50, in the "School Street Project" are cleaned and inspected annually as they were designed with deeper sumps in lieu of end-of-pipe storm water BMPs for that project. These catch basins are also treated for vector abatement. Similarly, catch basins on Lake Shore Drive are cleaned and inspected annually.

Problem ***manholes and catch basins are identified by supervisory review of the databases*** and are cleaned more frequently. ***In addition, catch basin cleaning occurs as preventive maintenance before anticipated precipitation events and when street flooding is reported by citizens or other City Departments. Catch basin repair and replacement occur as needed.***

The Sanitary District ~~also has a~~ maintenance crew ~~specifically for~~ ***performs*** lift station maintenance and repair, ***as required***. The ~~18~~ ***forty (40)*** lift stations are inspected ~~twice a week~~ ***a minimum of once per quarter, and more frequently as other tasks permit. The conversion to real-time telemetry permits the reduction of physical inspection frequency without compromising the operation and maintenance of the lift stations.***

[This change replaces the text in section 2.2.4, page 2-7 in the 1990 submittal.]

2.3 Treatment Plant Flows

The wastewater treatment plant average~~d 8.3 MGD in 1989~~ ***for 2000 through 2007 are tabulated below***. ~~and~~ The treatment plant has an averaged daily design flow ~~is designed for a flow~~ of 12.0 MGD ***and a peak hourly design flow of 15.0 MGD***. The ~~high and low daily~~ diurnal high flows may be equalized in the diurnal basin~~s~~ and the high storm flows are detained in the diurnal and storm water detention basins. Later in the report is a~~n~~ detailed explanation of the system. The wastewater treatment plant ***was last upgraded in 2005-06*** ~~has been recently upgraded and continues~~ ***with improvements to the headworks***. ***The wastewater treatment plant performance*** continues to meet its NPDES permit. The new plant facilities will also be explained in later sections.

Charts ~~and 2-5~~ show***ing*** the relationship of treatment plant flows to rainfall ***for 2006 and 2007 are found in Appendix E***.

[This change replaces the text in section 23, page 2-7, and Figures 2-3 and 2-4 in the 1990 submittal.]

2.4 Lift Station Flows

There are ~~twenty-five~~ ***forty (40)*** lift stations that the ***Sanitary District of*** Michigan City ~~Sanitary District~~ maintains ~~besides the lift stations at the Wastewater Treatment Plant~~. Table 2-2 is a list of existing lift stations***, with the type of telemetry and to which trunk sewer the lift station ultimately discharges. Flow rate (Q rate) was determined from Wonderware plots of the pump starts and wet well levels for those lift stations that were converted to Mission telemetry. Essentially, the analysis is a pump down test. Actual data from the analyses is found in the Appendices. A summary of available monthly flow data for 2007 and 2008 are found in the Appendices along with plots of daily flow versus daily rainfall.*** Figure ***2-5*** ~~2-6~~ shows the location~~s~~ of each lift station. ~~The lift stations in Michigan City have recently been revamped. The lift stations are visited daily are maintained on a schedule~~. ***Figure 2-6 illustrates hierarchy relationships between lift stations and private or proposed list stations.***

[Insert Table 2-2 here. Table is too large to fit on one page]

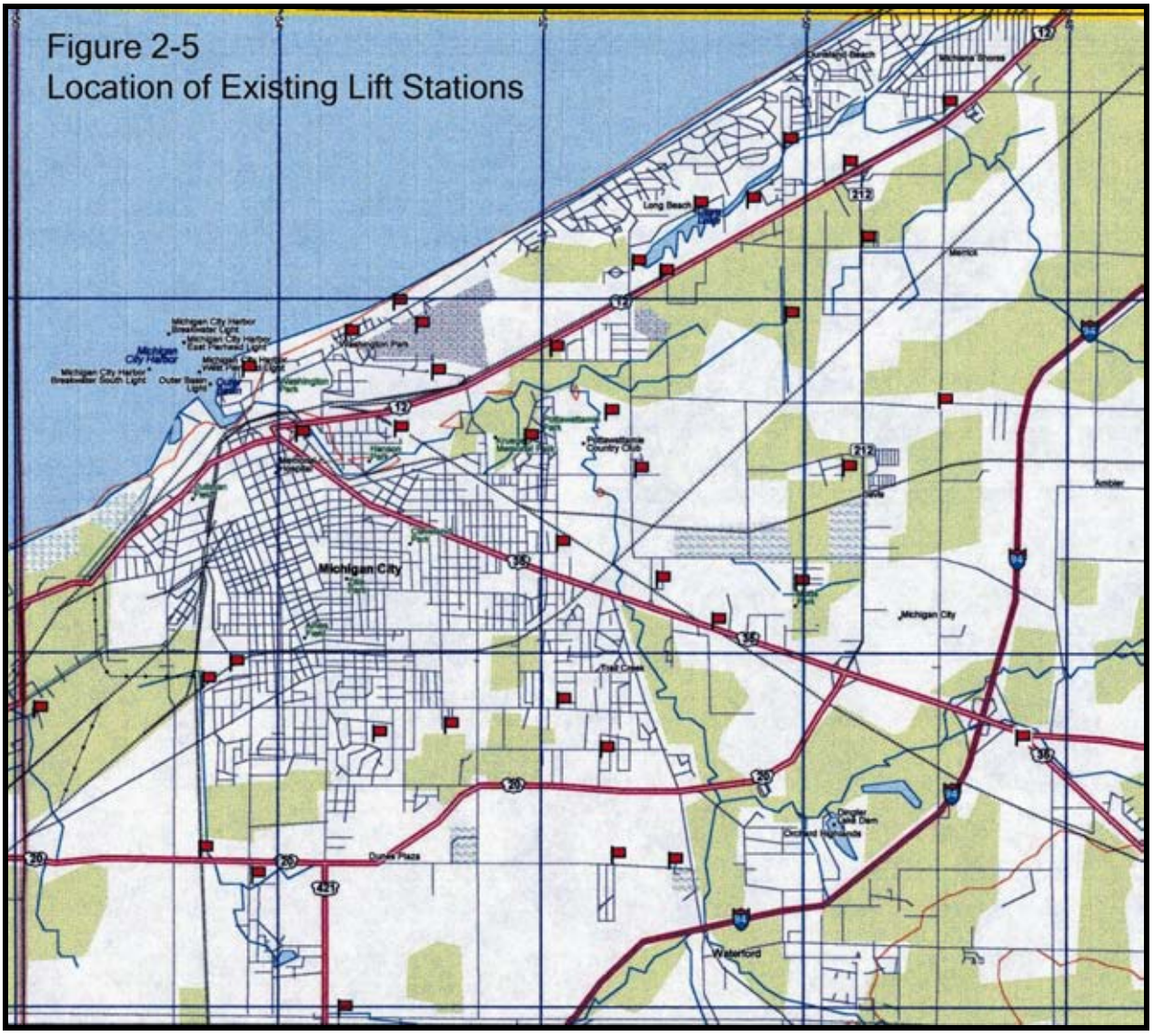
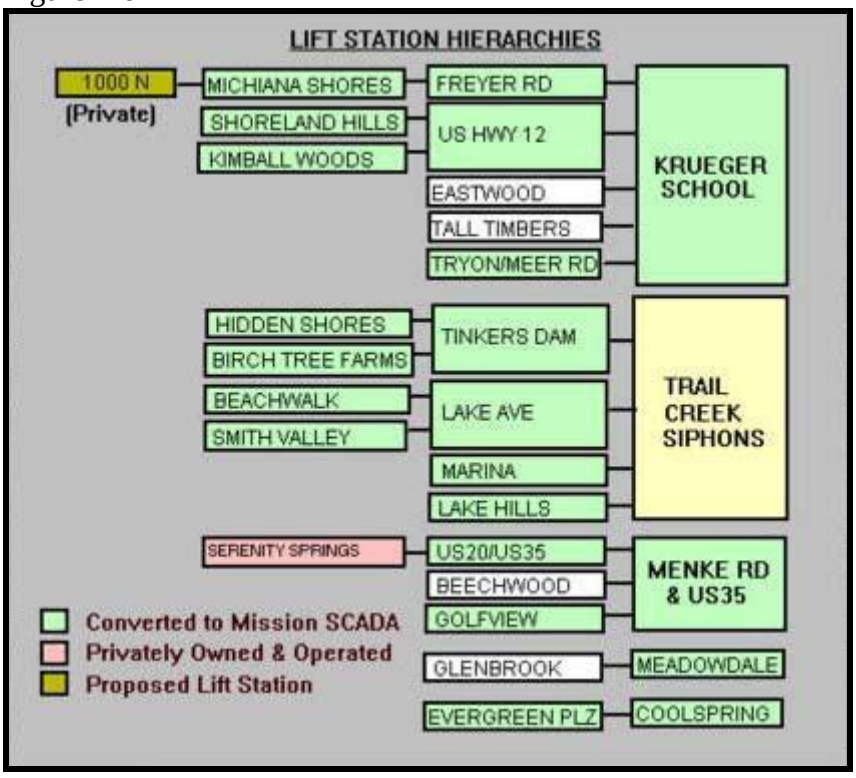


Figure 2-5
Location of Existing Lift Stations
Michigan City
Long Beach
Michiana Shores
Duneland Beach
Merrillville
Ambler
Waterford
Dunes Plaza
Trail Creek
Michigan City Harbor
Michigan City Harbor Breakwater Light
Michigan City Harbor East Pierhead Light
Michigan City Harbor Breakwater South Light
Outer Station Light
Washington Park
Harrison Park
Pottawattamie Park
Pottawattamie Country Club
Lake Michigan
Michigan City
Trail Creek
Dunes Plaza
Deegan Lake Dam
Orchard Manor
Waterford
12
212
35
20
421
94
65

Figure 2-6



[This change replaces the text in section 2.4, page 2-7, and Figures 2-5 and 2-6 in the 1990 submittal.]

2.5 Location of Overflows

~~2.5.1 Influent Structure Flow (1990 Submittal; 1.4 1996 Revision)~~
~~2.5.2 Stormwater Detention Basins Overflow~~
~~2.5.3 Location No. 3 - Fourth Street Box Sewer~~
~~2.5.4 Location No. 10 - East Side of Spring Street and Fourth Street~~
~~2.5.5 Location No. 11 - West Side of Spring Street and Fourth Street~~
~~2.5.6 Location No. 12 - East Side of Pine Street and Fourth Street~~
~~2.5.7 Location No. 13 - West Side of Pine Street and Fourth Street~~
~~2.5.8 Location No. 18 - West Side of Fourth Street and Inverted Siphon~~
~~2.5.9 Location No. 19 - East Side of Fourth Street and Inverted Siphon~~

Table 2-3 summarizes the historical and current status of the CSO overflows. Only one overflow remains, the discharge from the storm retention basins, Outfall 002A. That outfall is designed to prevent back flow of the receiving waters into the retention basins.

~~*[February 8, 1994 response to IDEM's comments]* IDEM: All combined sewer overflows should have flap gates, or be located to prevent back flow from the receiving stream. MCSD: The~~

~~overflows at the treatment plant are hydraulically elevated to prevent the receiving stream from backflowing into the plant. The overflows on the 4th Street Box Sewer will be discussed later~~.

[This change replaces the text in section 2.5 and all subsections, page 2-7 to 2-31 in the 1990 submittal.]

[Insert Table 2-3 here, table is too large to fit on one page]

2.6 Sewer System Problem Areas

~~Sanitary sewer extensions will be occurring primarily to the south and southeast. A major sanitary sewer trunk line is needed to the south in the next 4 years to handle the rapid growth in this area. The growth is primarily commercial with also a hospital being planned. A sewer to the southeast to the new Michigan City Airport will also be needed in the next 5 years. This is needed for the growth potential of the new airport.~~

~~The main sewer system problems in Michigan City pertain to the need for sewer separation in various areas of the City. The Sheridan Beach area is presently being overloaded due to its rapid growth and needs sewer separation of its combined sewers. An area just south of the treatment plant also needs its combined sewers separated. Approximately half of the sewers in Michigan City are separated.~~

Sewer system problems are identified from various sources: Telephone requests for service (this is the most common means); citizen complaints by email, walk-ins, meetings, etc.; information transferred from and generated by other Municipal Departments; and District generated work orders resulting from in-house inspection and maintenance programs.

Data on sewer system problems is tracked using an in-house two section paper work order system and entered into an Access database designed in-house to track work orders, see Appendix L. Identified problems are recorded on Section I of paper work order and dispatched to work crews by radio from the dispatcher or by management assignment. The work crew generates a Section II paper work order which is turned in at the end of the day to the District Foreman who examines the work order for completeness and notes additional work which may be required. If additional work is required, the work order is not turned in as completed. The District Foreman turns in Section II paper work orders to the Dispatcher who combines the Section I and Section II and enters the data into the work order database. The paper work orders are filed by year and stored. The computer database is archived for reference use and is backed up by the IT department on a regular basis.

The District Collection System Foreman and the Field Operations Supervisor review the data to determine the location of problem areas. A monthly and yearly report of work orders is printed and reviewed by the Field Operations Supervisor for analysis of trends and problem areas. A special emphasis is placed on the incidents of sewer blockage and the reduction of these incidents by increased preventive maintenance or other means of reducing the occurrences. These records are kept by the Field Operations Supervisor.

After reviewing the information from the work summary report and work order database report, the Field Operations Supervisor notes any duplicate location or repeated calls to a specific area and the cause of the sewer system problem (grease, debris, sand, roots, failed pipe, etc.) and determines an appropriate action to resolve these problems. If the problem resolution requires more than one isolated action, the problem is added to one of three monthly activity logs (Jet, Cut, or Vacuum) for repeated corrective action to resolve the problem. The monthly activity logs are generated at the beginning of each month and are assigned to collection crews by the District Foreman. Completed monthly logs are filed for future reference and analysis to determine if the location remains on the monthly log for repeated action.

[This change replaces the text in section 2.6, page 2-31 in the 1990 submittal.]

2.7 Groundwater Levels *[No changes recommended]*

2.8 Quality of Receiving Waters

Trail Creek is the receiving waterbody for the wastewater treatment plant, Outfall 001B, and the discharge from the storm retention basins, Outfall 002A. Trail Creek has a seven-day, ten year, low flow ($Q_{7,10}$) of 24 cfs (15.5 MGD). Trail Creek is in the Lake Michigan drainage basin, and is therefore subject to the Indiana Water Quality Standards applicable to all waters of the State within the Great Lakes System in accordance with 327 IAC 2-1.5.

The wastewater treatment plant outfall to Trail Creek is approximately 1.8 miles upstream of Lake Michigan. The Indiana portion of the open waters of Lake Michigan is designated as outstanding state resource water in accordance with 327 IAC 2-1.5-19(b). Discharge to tributaries of outstanding state resource waters are subject to antidegradation implementation procedures for outstanding state resource waters in 327 IAC 5-2-11.7.

Trail Creek has the following designated uses (327 IAC 2-1.5-5):

- ***For full-body contact recreation;***
- ***Capable of supporting a well-balanced, warm water aquatic community; and***
- ***Capable of supporting put-and-take trout fishing.***

Trail Creek is also classified as high quality water for all parameters except E. coli, mercury and PCBs under IDEM's 2006 303(d) list. Trail Creek is considered impaired (for designated uses) for E. coli (Category 5C, impairment addressed by TMDL); and for mercury and PCBs on the basis of fish consumption advisories (Category 5B). These same impairments are found in IDEM's proposed 2008 303(d) list.

[This change replaces Section 2.8, page 2-31 or the 1990 submittal]

2.9 Effluent Standards

The current NPDES permit contains effluent limitations and monitoring requirements for the wastewater treatment plant, Outfall 001B, in Part I, A; and effluent limitations and monitoring requirements for the storm water retention basin discharge, Outfall 002A, in Attachment A, as modified. The parameters and effluent limitations, if specified, are summarized in Table 2-4.

[Insert Table 2-4 here. Table is too large to fit on single page]

Figure 2-7 Aerial Photograph locating Outfalls 001B and 002A.

APPENDIX F contains a table that summarizes the plant performance for conventional pollutants form 2000 through 2007.

[This change replaces section 2-9, page 2-33, Figure 2-24, and Table 2-3 of the 1990 submittal]

2.10 City Ordinances

The Appendix contains all City Ordinances pertaining to storm water discharges *[1990 Submittal]*.

IDEM: The Sewer Use Ordinance must be updated with relevant parts of the language contained in the National Pollutant Discharge Elimination System Permit. MCSD: The items mentioned in the NPDES Permit are the items listed below. Please refer to the next section reduced [*February 8, 1994 response to IDEM comments*].

IDEM: The Sewer Use Ordinance must be updated to:

1. Prohibit inflow sources to any sanitary sewer.
2. Prohibit construction of new combined sewers,
3. Require that new construction tributary to the combined sewer be designed to minimize or delay inflow to the combined sewer.
4. Require separate inflow/clear water and sanitary connections to a combined sewer to facilitate disconnection of the former if a separate storm sewer becomes available.

MCSD:

1. ***City Code Sec. 98-311, Discharge of unpolluted water to sanitary sewer, states: No person shall discharge or cause to be discharged any unpolluted waters, such as stormwater, groundwater, roof runoff, subsurface drainage or cooling water, into any sanitary sewer.*** ~~50.05-1, Regulation for Use of Public Sewers states: No persons shall discharge or cause to be discharged any unpolluted waters, such as storm water, groundwater, roof runoff, subsurface drainage or cooling water to any sanitary sewer.~~

   Also, City Code Sec. 98-315, Dilution of discharge, states: No user introducing wastewater pollutants into a publicly owned treatment works shall augment the use of potable water process wastewater or mix separate waste streams or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with any standards set forth in this article.

2. City Code ***Sec. 98-225(h)*** ~~50.04-8~~, Building Sewers and Connections states: No person shall make a connection of roof downspouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building drain which in turn is connected directly or indirectly to a public sanitary sewer.

   City Code ***Sec. 98-312, Discharge of storm water, states: Stormwater and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as storm sewers, or to a natural outlet approved by the manager or approval authority and state or local agencies.***

~~50.05-2, states: Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designed as storm sewers or to a natural outlet approved by the Manager of Authority and state or local agencies.~~

City Code Sec 98.225(i), Specifications for connection, states: The connection of the building sewer into the public sewer shall conform to the requirements of the building and plumbing codes or other applicable rules and regulations of the city and the sanitary district. All such connections shall be made gastight and watertight, and verified by proper testing. (See sections 22-111 and 22-232, which adopt state rules and regulations.)

In addition, City Code Sec 98.225(l), Determination regarding system capacity, states: No connection shall be made, nor shall a permit to make a connection be issued, until and unless it has been determined by the manager that there is sufficient capacity in all downstream facilities to properly handle the additional effluent.

It is also Sanitary District policy not to construct any future combined sewers.

3. City Ordinance No. 2660 requires storm water retention. ~~and is included in its entirety with this document.~~

City Code ~~50.04-9, Building Sewers and Connections, refers to the City Building and Plumbing Codes which in turn states that the Indiana Plumbing Rules and Regulations is the ultimate authority.~~ ***Sec. 22-232, Adoption of state plumbing code, states***

(a) The Indiana Plumbing Code, 1985 edition (675 IAC 16), is hereby adopted by reference as the rules and regulations governing the construction and alteration of buildings and structures in the city.

(b) Notwithstanding any other provision of law, the plumbing rules and regulations as adopted in this section shall apply to all building and structures, including one- and two-family dwellings.

(c) A copy of this code and the rules, regulations and codes adopted in this section by reference are on file as required by law in the office of the city clerk.

~~The concept of different lines for sanitary and storm water from a building are covered under the Indiana code reduced~~ [*February 8, 1994 response to IDEM comments*].

The Sewer Use Ordinance needs to …

- *Prohibit construction of any new combined sewer or outfall;*
- *Prohibit any new connection to any combined sewer, unless the flow from the new connection will not cause or contribute to discharge from any portion of the POTW; including the collection system, other than Outfall 001; and*
- *Require that for any new dwelling or building connection to the combined sewer, any storm water connection be made separate and distinct from any sanitary waste connection to facilitate disconnection of the former if a separate storm sewer subsequently becomes available [NPDES Permit, Modified in 2006]*

3.0 Administrative Aspects

3.1 General *[No changes recommended]*

3.2 NPDES Permit Conditions

~~The proposed NPDES Permit which is included in the Appendix in its entirety has restrictions for combined sewer overflows.~~ The current NPDES Permit (IN0023752) became effective on November 1, 2004 and was modified effective February 13, 2006. Attachment A of the permit contains Precipitation Combined Sewer Overflow Discharge Authorization Requirements. Attachment A, as modified, is found in the Appendices.

[This change replaces section 3.2, page 3-1, of the 1990 submittal]

3.3 Sewer Use Ordinance

Present Michigan City ~~sewer use ordinances~~ ***Municipal Code*** ~~prohibit the direct connection of downspouts to the combined or sanitary sewer.~~ ***, Section 98-221. Definitions. defines the following terms related to this plan:***

"Combined sewer means a sewer intended to receive both wastewater and Stormwater or surface water"

"Sanitary sewer means a sewer that carries liquid and water-carried wastes from residences, commercial buildings, industrial plants and institutions, together with minor quantities for groundwater, Stormwater and surface water that are not admitted intentionally."

Section 98-225.(h) "Drainage or runoff or groundwater to sanitary sewer." states:

"No person shall make connection of roof downspouts, foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building sewer or building drain which in turn is connected directly or indirectly to a public sanitary sewer."

Section 98-315. Dilution of discharge. states:

"No user introducing wastewater pollutants into a publicly owned treatment works shall augment the use of potable water process wastewater or mix separate waste streams or otherwise dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with any standards set forth in this article."

~~These ordinances are included in the Appendix in their entirety.~~

[This change replaces section 3.3, page 3-1, of the 1990 submittal]

3.4 ~~Inter-Municipal~~ ***Sewer Use*** Agreements

The ***Sanitary District of*** Michigan City ~~Sanitary District~~ has ~~one intermunicipal~~ ***sewer use*** agreement***s with individual property owners, that are signed by the Sanitary District and the following entities***: Town of Pottawatomie Park, ***Town of Trail Creek, and Long Beach***. Th~~is~~***ese*** agreement***s*** do~~es~~ not allow stormwater to be put into the sewers ***covered therein.*** ~~of Pottowattomie Park. Portions of this~~ ***These*** agreement***s*** are ~~in the Appendix.~~ ***on file at the Administrative Offices of the Sanitary District.***

[February 8, 1994 responses to IDEM's comments] IDEM: How does Pottawatomie Park maintain their sewers? MCSD: ~~The Michigan City Sanitary District maintains the lift station and sewers in Pottawatomie Park.~~

Under all of the agreements, the Sanitary District has ownership and maintains the collection system and all appurtenances, including lift stations, if applicable.

[This change replaces section 3.4, page 3-1, of the 1990 submittal]

3.5 Industrial ~~and Subdivision/Sub-Area~~ Flows

~~Industrial customers in Michigan City have previously been investigated for Stormwater sources in the combined sewers and have been eliminated. Those industries with pretreatment requirements are constantly being monitored. Other industries are investigated every four years for stormwater violations.~~

~~The City presently have ordinances which do not allow projects with more than 10,000 square feet of impermeable surface to be built without stormwater retention. This ordinance is included in the Appendix.~~

[*February 8, 1994 responses to IDEM's comments*] IDEM: Up-pipe industrial dischargers were not identified in the Plan. It is important to know if industrial toxics will be directly discharged to the receiving stream. A list of all direct dischargers to the combined sewer system, along with the combined sewer they discharge to, the overflow, and if pretreatment is provided will satisfy this requirement. ~~MCSD: Industrial toxics are not discharged to any of the sewers in Michigan City. The industries which require industrial pretreatment in Michigan City do not discharge into combined sewers. Their discharges do not pass through the sewers by the Fourth Street Box overflows. Enclosed is a map locating these industries. Also enclosed is a brief description of the industrial dischargers in Michigan City.~~

[THIS SECTION WAS UPDATED IN THE REVISED CSOOP]

[This change replaces section 3.5, page 3-2, of the 1990 submittal]

3.6 Analysis Requirement When Approaching System Capacity

~~The Michigan City Wastewater Treatment Plant is not close to being at its capacity. Sewers in Michigan City are constantly being reviewed to their capacity and alternatives to remedy these problems.~~

An analysis of treatment plant influent flows versus average daily and peak hourly design flows was conducted in 2007 and updated in January 2008 as part of master planning for the next 20-year cycle. Appendix K has a summary table containing that data.

From the data, two conclusions can be drawn: first, for most months with heavy rainfall, the maximization of flows through the treatment plant can result in a monthly average flow in excess of the average daily design flow and over 80% of the peak hourly design flow; and second, despite an active program to separate combined sewers, there remains a significant wet weather impact on the treatment plant flows.

Master planning is ongoing and will attempt to address this issue and the need for continued combined sewer separation, infiltration and inflow control measures, and treatment plant improvements, including an increase in peak hourly design flow.

[This change replaces section 3.6, page 3-2, of the 1990 submittal]

4.0 Source Controls

4.1 General

~~One possible way of controlling pollution from combined sewer overflows is to reduce the amount of contaminants in the stormwater, This can be done with source controls, which remove pollutants from the stormwater flow path.~~ ***Technology-based controls, also known as the nine minimum controls, are designed to minimize the impact of combined sewer overflows on the water quality of the receiving water body by utilizing source control and collection system controls. These include pollution prevention programs, pretreatment programs, and proper operation and maintenance of the collection system to minimize the duration of overflows and maximize flow to the treatment plant. Since all the collection system overflow points have been eliminated, the technology-based controls result primarily for maximization of flows for treatment.***

[This change replaces section 4.1, page 4-1, of the 1990 submittal]

4.2 Street Cleaning

Street cleaning, to remove debris, dirt, and dust, is used to reduce the source of storm water related pollutants. The majority of the street contaminants are soil and asphalt

erosion, automobile contaminants and sand due to the area. Street cleaning is accomplished by mechanical broom sweepers. Mechanical broom sweepers loosen dirt from the street surface and collect it in a temporary hopper. The Michigan City Street Department cleans the City streets ~~on a continuous basis on days when there is no snow or other precipitation occurring~~ weekdays from early Spring to late Fall, when the dangers of freezing are not present. The City of Michigan City has two street sweepers in use. ~~There are no apparent high loading areas in the City and therefore, the City is cleaned on a continuous basis with no priority to locale~~ ***The City is split into three sections. Both sweepers work in the same section and complete all streets in the section within a week. Each section is repeated every three weeks.*** [*1990 submittal*]

IDEM: A schedule for street, catch basin and regulator cleaning should be included in the plan. MCSD: ~~Streets in Michigan City are cleaned regularly in Michigan City during non-winter periods. The average street in Michigan City is cleaned approximately every two weeks in Michigan City.~~ [*February 8, 1994 response to IDEM comments*]

[This change replaces section 4.2, page 4-1, of the 1990 submittal]

4.3 Catch Basin Cleaning

A catch basin is a chamber of well which accepts street surface water and discharges into a sewer. The catch basin has a sediment sump at this base which traps some of the coarse debris and grit from the surface water. This minimizes sewer clogging and reduces the amount of pollutants which may enter and eventually settle out in the sewers. Cleaning of these catch basins prevents accumulation of sediment which can become re-suspended and enter the sewer with the basin overflow.

The Sanitary District of Michigan City currently ***uses*** ~~has one three~~ ***two-***man crews***, consisting of one Sewer Maintenance I, and one Sewer Maintenance II job classifications.*** ~~which only does catch basin and sewer cleaning. This crew not only handles the normal clogging situation but also follows a preventive maintenance program of systematically cleaning all the catch basins and sewers in Michigan City~~ ***The crews use combination jet/vacuum trucks and receive their daily assignments from the Field Operations Supervisor. One crew is assigned to emergency service calls, the second crew is assigned to preventive maintenance, conducted over a three-year cycle, and the third crew is assigned to the GPS/video duties, conducted on a ten-year cycle.*** [*1990 submittal*].

IDEM: A schedule for streets, catch basin and regulator cleaning should be included in the plan.
MCSD: ~~Catch basins are cleaned as a part of the sewer cleaning crew's duties. Catch basins are cleaned at least once a year but many are cleaned on a monthly basis due to need. The City of Michigan City has reduced the amount of sand which they use for the streets during the winter months from 5:1 to 1:1 this year. It is hoped that the amount of catch basin cleaning in the spring will be reduced dramatically. The Sanitary District has met with the City of Michigan City to offer the possible purchase of additional salt for the City, so that the amount of sand can be further reduced~~ ***Rather than sand, the City routinely uses salt mixed with an organic beet juice (proprietary) mixture and has for the last four years. The first sand the City used in recent years during the winter was early 2008 when there was no more salt to be purchased. Sand was applied reluctantly as a last choice. A new salt shelter has been built to stockpile additional salt.***
[*February 8, 1994 response to IDEM comments*].

IDEM: The Plan did not discuss the reduction of the size of street inlets to the catch basins.
MCSD: ~~The reduction of street inlets to the catch basins would induce street flooding in Michigan City. This is not a desirable alternative. It is proposed that the storm water be handled at the Treatment Plant. If the plant can not adequately handle the flows in the future, this alternative will be seriously considered~~. [*February 8, 1994 response to IDEM comments*]. ***There are recently installed flow restrictors in catch basins at South and Lafayette Sts. and on Loran Road and Frey Court. These restrictors successfully prevent surcharging of the combined sewer during heavy rains. Both of these***

combined sewer areas are scheduled for separation. Other restrictors will be enumerated as the manhole/catch basin inspection is completed.

[This change replaces section 4.3, page 4-1, of the 1990 submittal and comments submitted in the 1994 revision.]

4.4 Sewer Flushing

The dry weather deposition of solids in sewers is a major cause of the "first-flush" phenomenon. The average dry weather flow velocities are inadequate to keep solids suspended, especially where sewer grades are flat. Up to 30% of the total collected solids may be deposited in combined sewers. Periodic sewer flushing can remove and transport the material to the treatment plant before a storm event washes it into a receiving stream via an overflow. Sewer flushing also maximizes the hydraulic capacity of the sewer for wet weather flows.

~~The Michigan City Sanitary District as stated in 4.3 has a crew which only does catch basin and sewer cleaning. This crew has a schedule which they follow which cleans all the sewers in Michigan City in a two year period. The crew also handles emergency calls on areas which exhibit excessive problems~~ *[1990 Submittal]*.

IDEM: Item II of the Checklist refers to schedules for the implementation of various sewer maintenance tasks. These schedules should be included in the Plan and should be sufficiently detailed such that new employees could properly maintain the system. Specific schedules for the inspection of combined sewers, overflows and flap gates, along with schedules for sewer televising and combined sewer cleaning and flushing [*sic*].
MCSD: ~~The inspection of the combined sewers is an on-going process and is primarily done by the District Sewer Foreman. The Foreman is in charge of all field crews associated with the sewers of Michigan City and visually inspects the sewers and overflows as his people are working on them.~~

All sanitary and combined sewers are cleaned or inspected once every three years. Sewers are also cleaned on each service request call as part of the SOP for service call response.

The Field Operations Supervisor determines the areas for cleaning and inspections. The preventive maintenance cleaning is sequential and consequently, if crews are diverted to a higher priority area, such as cleaning in preparation for a imminent construction project, the crews will return to the proper area in the sequence.

Data on sewer system Preventive Maintenance is tracked using an Access database designed in-house to track this work. The database is archived for reference use and is backed up by the IT department on a regular basis.

As stated, a two (2) person crew, commonly consisting of a Sewer Maintenance Man I and a Sewer Maintenance Man II, cleans and/or inspects all sanitary sewers every three years. Sewer cleaning consists of flushing unless an excessive amount of debris is noted by the crew. If debris is noted, the line is vacuumed while flushing. All District flushing vehicles are combination jet/vacuum units. Jet/Vacuum cleaning of the segment upstream of a lift station requires the presence, or at a minimum, notification of the lift station department.

Records are kept on sewer blockages and reviewed in accordance with the procedures described in Section 2.6.

Sewer televising is accomplished on an as-needed basis. There is no regular schedule for this activity. All collection system personnel are required, as part of their Job Description, to be trained and certified trained on assisting televising procedures. Several employees will be trained on televising operations. Work assignments are made based on the current work activity demand. First priority is given to sewer backup issues, second to locate requests and third to routine or preventive maintenance requirements.

~~The sewers of Michigan City are periodically cleaned. There are two sewer jetters and one sewer vacuum truck. One sewer jetter is continuously being used for emergency calls, trouble areas which need monthly attention, and root cutting which is a major problem in Michigan City. The other sewer jetter is used for the regular sewer cleaning. The City is divided into 8 parts for the crew. Each area requires a month and a half to clean its sewers. This allows all sewers in Michigan City to be cleaned at least once a year. The vacuum truck is used by both crews, as needed~~ [*February 8, 1994 response to IDEM comments*].

The system is currently mapped into 36 sections. There are 3 sewer trunk sections mapped by route to the treatment plant. Section A, roughly the City's south and east side, feeds the 72" sewer; section B, roughly the west and central City side, feeds the 54" sewer; and section C, the north side, feeds into the 54" at the E Street Bridge.

[This change replaces section 4.4, page 4-1, of the 1990 submittal and comments submitted in the 1994 revision.]

4.5 Conclusions

The Michigan City Sanitary District utilizes all the source control measures which are listed by the USEPA and IDEM. ~~The future plans for the City is to reinforce these controls and to strive to increase the frequency of the preventive maintenance schedule~~ *[1990 Submittal]*.

The Sanitary District has two goals for sewer maintenance activities:

A. Section 2.2.4 states all manholes and catch basins will be cleaned as needed, based on review of data, and problem areas more frequently. Section 4.4 states that all sewers are flushed in a two year period; and

B. Current practice is to clean and /or inspect, for preventive maintenance, all sewers every three year. The current goal for manholes and catch basins is to conduct inspection on a 10 year cycle, or 20 miles per year. This policy was present to and approved by the Sanitary District Board of Commissioners

In addition, areas within the Sanitary District establish annual goals. For 2008, the annual goals for the Collection System Area are:

1. ***2008-CS-01: Improve service to our customers by reducing the number of line blockages that occur within our public sewers. Reduce the overall annual number of line blockages by 10% from 2007 to 2008 through focused attention on target areas.***

2. ***2008-CS-02: Document the existing condition of our sanitary sewer system through video inspection methods. Inspect 20 miles of our sanitary sewers through video inspection methods in 2008. This represents approximately 20% of our sanitary sewer network.***

3. ***2008-CS-03: Document the existing condition of our sanitary sewer system though manhole inspection methods. Inspect 20% of our sanitary sewer manholes through visual inspection methods.***

4. ***2008-CS-04: Determine and reduce the Inflow and Infiltration (I/I) into the sewer systems discharging into Clark List Station and the Freyer Road Lift Station. Reduce wet weather flow into the Clark Lift Station and Freyer Road Lift Station by 50%.***

[This change replaces section 4.5, page 4-2, of the 1990 submittal and comments submitted in the 1994 revision.]

5.0 Sewer System Controls

5.1 Regulators

The proper operation of regulator devices is very important in controlling combined sewer overflows. Regulators control the distribution of flow from the combined sewers between the interceptors and the outfalls. During dry weather, all of the flow should be diverted to the interceptors. During wet weather, the regulators should divert the maximum flow to the interceptors without exceeding interceptor or treatment plant capacity. The excess flow should be backed up in the combined sewers. Only after maximum use of the combined sewer storage capacity is achieved, should wet weather flow be discharged to

the receiving water. This requires careful operation and maintenance of the regulator devices *[1990 Submittal]*.

IDEM: A schedule for streets, catch basin and regulator cleaning should be included in the plan. MCSD: ~~Catch basins are cleaned as a part of the sewer cleaning crew's duties. Catch basins are cleaned at least once a year but many are cleaned on a monthly basis due to need. The City of Michigan City has reduced the amount of sand which they use for the streets during the winter months from 5:1 to 1:1 this year. It is hoped that the amount of catch basin cleaning in the spring will be reduced dramatically. The Sanitary District has met with the City of Michigan City to offer the possible purchase of additional salt for the City, so that the amount of sand can be further reduced~~ [*February 8, 1994 response to IDEM comments*]. ***See Section 2.2.4.***

[This change replaces section 5.1, page 5-1, of the 1990 submittal and comments submitted in the 1994 revision.]

5.2 Conventional Designs

Conventional designs are subdivided into three groups: static, semi-automatic and automatic.

5.2.1 Static Regulators

Static regulators are limited in the adjustments that can be made to vary the flow distribution. There are few or no moving parts in most types of static regulators. Because control is minimal, the effectiveness of operation is dependent upon regular inspection and maintenance. Static regulators include; manually operated gates, fixed orifices, leaping weirs, side-spill weirs and internal self-priming siphons.

5.2.1.1 Manually Operated Gates

Manually operated gates are typically used for diverting wet weather flows of less than 4 cfs since use of dynamic regulators for such small flows is not economical. For this reason, this option does not apply to Michigan City. Flows in combined sewers in Michigan City far surpass 4 cfs.

5.2.1.2 Fixed Orifices

These regulators are used for diverting wet weather flows of less than 2 cfs. The two types of fixed orifice regulators are vertical and horizontal. Due to the high flows in the Michigan City combined sewers, this option *is* not applicable.

5.2.1.3 Leaping Weirs

The leaping weir consists of an opening in the bottom of the sewer through which the dry weather flow drops into a branch interceptor and is conveyed to the main interceptor. Leaping weirs are used for intercepting low flows. The opening can be varied by adjusting a weir, which controls the amount of flow going to the interceptor. During wet weather, the higher flow velocities and volume carry most of the combined sewage and storm water over the opening and to the outfall pipe. Michigan City does not use leaping weirs due to the tight hydraulics of their sewers and the extreme high flows.

5.2.1.4 Side-by-Side Weirs

The side-spill weir is constructed parallel to the combined sewer axis to divert flow from the interceptor. Excess flow passes over the side spill weir into the outfall sewer. The weir should be set to hold back peak dry weather flow, as well as to maximize the use of interceptor capacity during wet weather. This regulator may be used for any volume flow.

~~Michigan City presently uses side spill weirs along the 4th Street box storm sewer. These overflows are shown in detail Chapter 2.~~ ***All side-by-side weirs along the 4th Street box sewer have been sealed; see section 2-5, Table 2-3. These weirs will be inspected and photographed in 2008 and annually by June in each subsequent year. Rounds of 4 wet and 2 dry weather testing for E. coli was conducted in 2005 on this sewer. The wet weather counts were an average of 637 c/100ml with rains from 0.24" to 1.22". The dry weather counts were an average of 345 c/100ml. The results do not indicate a direct sanitary sewer cross connection or failure of the sealed openings.***

[This change replaces section 5.2.1.4, page 5-2, of the 1990 submittal.]

5.2.1.5 Internal Self-Priming Siphons

Internal self-priming siphons are not utilized in Michigan City due to the fact that sand accumulates excessively in these siphons and is a major maintenance problem. Inverted siphons are located in the City in ~~two~~ ***the locations indicated below*** .~~and this is the practice experienced in the past. Michigan City's location presents a sand problem for cleaning.~~

(2) siphons under Trail Creek just west of E Street Bridge: Status Active

(1) siphon in alley to east E Street alley between Union St. and Emily St.; conflict with water main; 8": Status Active

(1) siphon in alley to east of Emily Street between Emily St. and Miller St.; conflict with water main; 10": Status Active

(1) siphon on Grand Avenue between Gladys St. and Roeske Ave.; conflict with water main; 24": Status Active

(1) siphon in line between Wolf Ave. and Rogers Ave.; conflict with stream; 8" : Status Active

(1) siphon on U.S. Highway 20 line at east side of Terrace Acres at Terrace Acres; conflict with ditch; 12": Status Active

(1) siphon at manhole B17 West side of 4th Street, closed CSO #18: Status Inactive

(1) siphon at manhole B16 East side of 4th Street, closed CSO #19: Status Inactive

[This change replaces section 5.2.1.5, page 5-2, of the 1990 submittal.]

5.2.2 Semi-Automatic Regulators

Semi-automatic regulators can be adjusted over a limited range to vary the distribution of flow. There are moving parts in these regulators but they are not suitable for remote control. Semi-automatic regulators include float operated gates, tipping gates, and cylindrical gates.

Michigan City decided that when automation is required such as at the Sewage Treatment Plant, fully automatic regulators would be utilized, therefore, no semi - automatic regulators are used or planned to be used in Michigan City.

5.2.2.1 Float Operated Gates

Float operated gates are normally used for diverted flows greater than 4 cfs. The regulator consists of a diversion chamber, and, if needed, a tide gate chamber. An overflow dam in the diversion chamber diverts flow into the regulator chamber. An overflow dam in the diversion chamber diverts flow into the regulator chamber. Excess flow passes over the darn, through the tide gate chamber, which' prevents backflows from the receiving water, and into the overflow pipe. Between the diversion and regulator chambers is a regulatory gate which controls the amount of sewage entering the regulator chamber and thereby entering the main interceptor via the branch interceptor. This gate is linked to a float in a float well which may either be connected to the combined sewer or the interceptor flow channel.

5.2.2.2 Tipping Gates

The tipping gate regulator can be used to divert a wide range of flows. This regulator is similar to that of the manually operated gate described in the static regulator section. The only difference between the two gate regulators is the type of gate used. The tipping gate between the diversion and orifice chambers is a metal plate with a pivot below its center of gravity. The gate is mounted so the flow must travel under the gate to reach the branch interceptor. During dry weather the flow is low enough to go under the gate. During wet weather, the flow velocity increases and the water level rises putting pressure on the

upper portion of the gate, i.e. above the pivot. This causes the gate to turn about the pivot and partially close the opening.

5.2.2.3 Cylindrical Gates

A cylinder gate regulator consists of a horizontal orifice in a chamber beside the combined sewer. Flow is diverted by a dam through an opening in the side of the sewer into the gate chamber. The sewage then drops through the horizontal orifice into the branch interceptor which conveys the flow to the main interceptor. The closing of the orifice is controlled by a cylindrical gate hung over the opening and balanced by a counterweight. The gate may be controlled by the sewage level in either the branch interceptor or the combined sewer.

5.2.3 Automatic Regulators

Automatic regulators are fully adjustable and can be easily adapted to remote control. Automatic regulators include cylinder and motor operated gates.

5.2.3.1 Cylinder Operated Gates

Michigan City has decided to use electrically operated gates in lieu of cylinder operated gates for flow diversion. ***There is one cylinder operated gate at the headworks of the Stormwater Control Building. In the event of a power failure, the gate automatically closes, which bypasses the bar screen and diverts the storm flow through the 72-inch sewer to the second storm basin.***

[This change replaces section 5.2.3.1, page 5-4 of the 1990 submittal.]

5.2.3.2 Motor Operated Gates

Michigan City utilizes numerous motor operated gates for flow diversion and overflow at the sewage treatment plant. Chapter 6 explains these gates operation in detail.

5.3 Improved Regulator Designs

Improved regulator devices consist of fluidic regulators, vortex regulators., swirl concentrators, helical bend concentrators, stilling pond regulators, high side-spill weirs, tide gates, broad crested inflatable fabric dams, leaping orifice flow regulators and scepter flow regulators.

5.3.1 Fluidic Regulators

A fluidic regulator consists of a weir, a control port, an air slot, a simple level sensor, a communication line, and an elevated exit weir and dry weather flow entry point. The

combined sewer splits into a branch interceptor sewer which conveys the flow to the treatment facility and a storm sewer where excess flow is conveyed to the receiving waters. During dry weather periods, a· low dam in the storm sewer diverts all of the flow to the branch interceptor sewer and then to the wastewater treatment facility. In wet weather periods, the flow is regulated by the amount of air pressure or vacuum supplied. This pressure or vacuum is self-induced by the flow in the sewer by use of pneumatic devices. Any flow in excess of design is passed over the unit into the overflow channel.

5.3.2 Vortex Regulators

Vortex flow regulating devices replace weirs and float controlled flow regulators presently being used in sewer systems. They consist of a circular channel in which rotary motion of the sewage is induced by the kinetic energy of the sewage entering the tank. Flow to the wastewater treatment facility is diverted and discharges through a pipe at the bottom and near the center of the devices. During wet weather periods, excess flow discharges over a circular weir around the center of the tank and is conveyed to the receiving waters. The rotary motion causes the sewage to follow a long path through the channel resulting in secondary flow patterns. These patterns in turn create an interface between the fluid sludge mass and the clear liquid. The flow containing the concentrated solids is directed to the intercepting sewer.

5.3.3 Swirl Concentrators

The swirl concentrator is of simple annular shaped construction and has no moving parts. It consists of an inlet ramp, a flow deflector, spoilers, a scum ring, floatable collectors, floor gutters, and overflow weir, and a foul sewer outlet. The flow is regulated by a central circular weir spillway, with solid/liquid separation occurring by way of flow path induced inertial separation and gravity settling. Dry weather flows are diverted through the foul sewer outlet by way of a channel location in the floor of the chamber to the wastewater treatment facility. During wet weather periods, the low volume concentrate (3 to 10 percent of the total flow) which includes sanitary wastes, storm water runoffs, and solids concentrated by swirl action, is diverted by way of the foul sewer outlet to the intercepting sewer. The excess flow overflows the central circular weir into a down shaft for storage, treatment or discharge to the receiving waters.

5.3.4 Helical bend Concentrators

The helical bend concentrator consists of an inlet from the entrance sewer section to the device, a transition section from the inlet to the expanded straight section before the bend, an overflow side weir and scum baffle, and a foul outlet for concentrated solids removal and control of the amount of underflow going to the wastewater treatment facility. During dry weather periods, the flow goes through the lower portion of the device to the intercepting sewer and then to the treatment facility. As the level of flow increases during wet weather periods, helical motion begins and the solids are drawn to the inner wall and drop to the lower level of the channel leading to the treatment facility. When the storm subsides, the

flow velocity increases due to a constricted channel, thereby preventing the accumulation of solids. The excess flow passes over the side weir and is discharged to the receiving waters. Floatables are prevented from overflowing by a scum baffle along the side weir and collect at the end of the chamber, which is then conveyed to the treatment facility as the flow level subsides.

5.3.5 Stilling Pond Regulators

The stilling pond regulator is a short length of a widened channel from which settled solids are discharged to the interceptor sewer. The flow to the interceptor sewer is controlled either by the use of an orifice on the outlet in the chamber or by the use of an outlet pipe designed in such a manner that it will surcharge during wet weather periods. Its discharge is dependent upon the sewage level in the regulator. Excess flows during wet weather periods travel over a transverse weir and are conveyed to the receiving waters.

5.3.6 High Side-Spill Weirs

Unsatisfactory experience with side-spill weirs has led to the development of the high side-spill weir. The weirs are made shorter in length and higher in height than would be required for the normal side-spill weir. The rate of flow to the treatment plant may be controlled by use of a throttle pipe or a mechanical gate controlled by a float.

5.3.7 Tide Gates

The purpose of tide gates (including backwater gates and flap gates) is to protect intercepting sewers and collecting sewers from high water levels in receiving waters. The gates open and permit discharge at the outfall when the flow in the sewer system regulator chamber produces a small differential head on the upstream face of the gate. ***A flap gate, or tide gate, was discovered at the intersection of Sixth St. and Willard Ave approximately 12 years ago. It is a flapper valve from the 27" "Prison" line to the 8'x10' (4th Street) box storm sewer. The flapper is forced closed with wood cribbing and checked periodically.***

[This change replaces section 5.3.7, page 5-6, of the 1990 submittal.]

5.3.8 Broad Crested Inflatable Fabric Dams

The broad crested inflatable fabric dam is a variably- controlled gating structure manufactured from reinforced rubberized fabric. This fabric is shaped into a sealed tube, and can be pressurized with either water, air, or both. The inflatable dam is installed in a deflated state and can assume the shape and contours of the foundation surfaces. Combined sewer flow is regulated and sewage or storm flow is diverted to the intercepting sewer by the operation of the inflatable dam. Overflow is regulated by

simply increasing the elevation of the dam by either automatic, semi-automatic, or manually operated controls.

5.3.9 Leaping Orifice Flow Regulating Device

The leaping orifice is a device to control the flow from the combined sewers to intercepting sewers. During dry weather conditions, the flow drops through the opening and is transported by the intercepting sewer. During wet weather periods when flows are at times in excess of the peak dry weather flow rate, the flow produces a higher head on the inlet tube, thereby giving it a higher velocity. The discharge from the inlet tube under this increased velocity will leap across the opening to the outlet tube which bypasses the flow to receiving waters. The flow which does not leap across the opening is directed to the intercepting sewer. As the flow depth in the combined sewer at the inlet tube increases so does the amount of flow that leaps across the opening and is bypassed to the receiving waters.

5.3.10 Scepter Flow Regulators

This regulator comes in two versions - insert and plate. Both types are constructed of PVC which is intended to withstand corrosive effects of road deicing salt, abuse during installation and maintenance, and other adverse conditions. The insert type scepter flow regulator is intended for insertion into standard 8", 10" or 12" pipes leading from an inlet or catch basin. The primary application of the plate type scepter flow regulator is in those situations where the insert type cannot be readily used, such as rough or irregular conditions at the entrance to the outlet pipe. The plate type also facilitates ease of removal .and cleaning relative to the insert type. The orifice is diamond shaped with a rectangular keyway at the bottom. The primary purpose of this keyway is to keep buoyant debris below the bottom of the diamond during dry periods. At the onset of a runoff event, the device is expected to function such that buoyant debris jammed against the keyway will rise, encounter the wider diamond portion of the office, and immediately flow from the inlet or catch basin. *[1990 Submittal]*

5.4 *Maximization of Storage Capacity in the Combined Sewer System*

IDEM: The Plan should discuss procedures to maximize the use of storage capacity of the combined sewer system.
MCSD: This option would be difficult to implement. The Michigan City sewer system is extremely old and sewer separation has ***proceeded as funding is available*** ~~been accomplished on an as-needed basis Sewer separation projects have been done in the past, as funding has been available,~~ and when excessive flooding in an area has prompted the construction. ~~The problems which result from this type of project phasing are that combined sewers flow into separate sewers and then into combined. This type of situation does not allow the use of sewer storage as an~~

~~option. Flooding of basements would become more frequent than already is experienced.~~

The use of combined sewers as a storage device ~~also~~ results in additional sewer cleaning. Material settlement increases with this type of use. [*February 8, 1994 response to IDEM comments*]

As sewer separation projects have progressed, sanitary sewers have been added to unsewered areas within Michigan City and wastewater from adjoining communities has been accepted. Often this requires a lift station. When a new lift station is constructed, the on/off levels for pumps are set to safely balance the risk of surcharging the lift station's sewer system with frequency of pump starts and duration of pump run time. With the conversion from alarm/no alarm telemetry to real time telemetry, data were collected which permits adjustment in those level set points to balance these concerns more efficiently. In the case of Tinkers Dam, Freyer Road, and Beachwalk Lift Stations, this has resulted in the utilization of the collection system for storage in order to reduce the frequency of pump cycles and extend the pump run time per cycle.

6.0 Treatment Plant Operations

6.1 General

~~To realize the reduction of CSOs requires~~ ***One of the nine minimum technology-based controls require*** maximizing the capacity of the wastewater treatment facility. ~~As a part of the recent~~ ***In the mid-1980's under a*** wastewater treatment plant improvements project, combined sewer overflow management was a major portion of th***at***~~e~~ project. The improvements which were made significantly reduced CSO occurrences. ***In 2005-2006, improvements were made to the preliminary treatment stage, aka headworks, which resulted in more efficient flow controls and, in turn, improved the maximization of flows through the treatment facility.*** The following is a description of the ***headworks improvements and how flow through the treatment facility is maximized*** ~~which have been made in the past few years~~.

6.2 Combined Sewer System Relief Sewer

In order to ~~reduce~~ ***eliminate*** CSOs at the Fourth Street Box, it was necessary to provide a CSO relief sewer to enable the wet weather flows to reach the treatment facility. The ~~new~~ relief sewer is shown on Figures 6-1, 6-2, 6-3 and 6-4. The new relief sewer was constructed on 4th Street from Wabash Street to Trail Creek and thence along Trail Creek to the Wastewater Treatment Plant. This ~~new~~ relief sewer carries both dry weather and wet weather flows ~~and greatly reduces the amount and frequency of~~ ***and, along with the sealing of overflow regulators, eliminated*** combined sewer overflow into the 4th Street storm sewer and thence to Trail Creek. The existing sewers ~~shall~~ continue to transport both dry weather and wet weather flows from this area to a junction point with the ~~new~~ ***relief*** sewer. From this point on, the existing sewer was removed to make room for the ***relief*** ~~new~~ sewer. The ***relief*** ~~new~~ sewer maximum capacity is 25 MGD and the old sewer capacity ~~is~~ ***was*** 10 MGD prior to their connection.

The ***relief*** ~~new~~ sewer capacity is 35 MGD after the sewer junction. The basis of design of the combined sewer system 4th Street relief sewer was established by the Indiana State Board of Health and is for a storm with an intensity of 0.64 "/hr. for a 1-1/2 hour duration. This design storm has an occurrence frequency of 3 months.

[This change replaces section 6.1, page 6-1 of the 1990 submittal]

6.3 Treatment Plant Stormwater Control

6.3.1 Combined Sewers

In the mid-1980's, a ~~A~~ 54" combined sewer influent line at the treatment plant replaced an existing 42" plant sewer which was described in Section 6.2. The new 54" combined sewer ~~shall~~ terminate***d*** at the old Wet Weather Flow Diversion Structure. The 54" sewer capacity is 35 MGD.

During that same project, the 72" influent line to the treatment plant was extended to the Storm Basins and the 72" overflow was eliminated.

6.3.2 Process Description

A major impact on treatment plant operations was a result of the Headworks Improvement Project. That project was substantially complete on July 26, 2006 and final completion was November 2006. The project included replacement of bar screens, grit removal, influent pumps, flow control systems and the main switchgear. Since existing equipment was replaced, the new equipment and facilities were phased into operation. The following table compares the old and new equipment and operation; refer to Figures 1 and 2 for treatment stage process diagrams:

Improvement	Old Headworks	New Headworks
Screenings	There were three electric motor driven catenary bar screens with continuous rakes on chains and 3/4 inch bar spacing. Two were rated at 10MGD and used in dry weather. The third was rated at 45 MGD and used for wet weather flows. Screenings discharged to a conveyor belt that transported the wet screenings into a 20 yard box for disposal at a landfill.	There are three hydraulic driven crawler screens with 5/8 inch bar spacing. Each bar screen is rated at 15 MGD. Two are used in dry weather and the third is used for wet weather flows. Additionally, each bar screen discharges to a screenings press that washes the material and compresses the washed screenings into a cake, reducing the water content substantially. Washed screening are discharged into 90 gallon refuse containers and ultimately picked up as municipal solid waste by the MC Refuse Dept.
Grit Removal	Sand and other inert material was removed in two channels with flow proportional weirs and a third, aerated grit chamber for storm flows. The material was placed on a conveyor belt by continuous chain and bucket mechanisms. The conveyor transported the wet grit to the same 20 yard box, commingling with the screenings. Final disposal was in a landfill.	Sand and other inert material settles in the sumps of two 30 MGD vortex grit removal tanks. Periodically the grit slurry is pumped to two vortex grit washers that separate the grit from the slurry and use a screw conveyor to dry the grit and discharge it into 90 gallon refuse containers. The containers are dumped into a 3.9 yard trailer, which is used to transport the grit to the sludge storage area. Semiannually, grit is land applied with dewatered sludge.

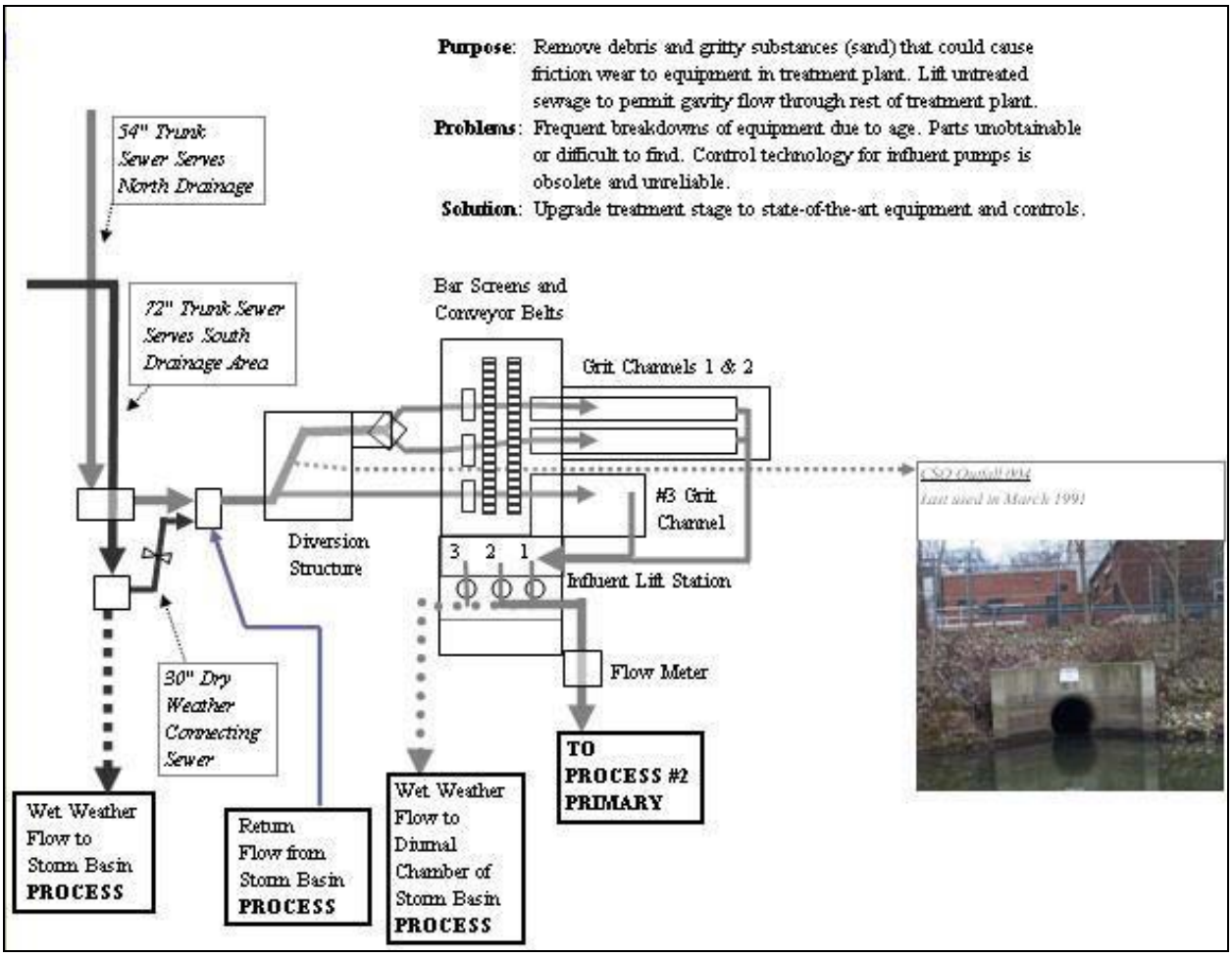


Figure 1: Old Headworks

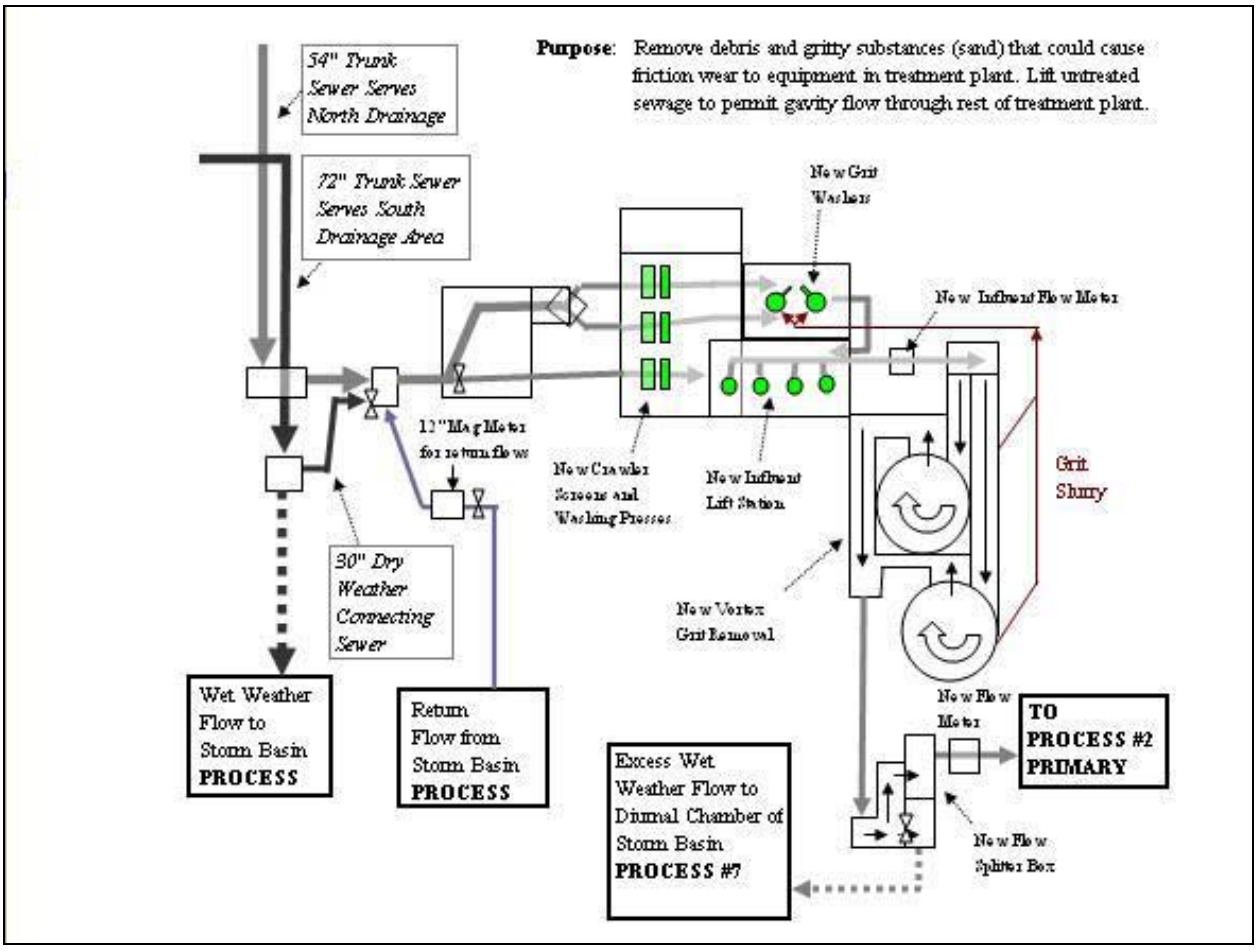


Figure 2: New Headworks

Improvement	Old Headworks	New Headworks
Influent Pumps	Wastewater was lifted to the primary clarifiers by one 15 MGD horizontal centrifugal pump. Two other 15 MGD pumps were used to divert excess flow to the diurnal storm basin. Only one of the two other pumps could be used for treatment plant flows. Two pumps were variable speed controlled by an electrolyte driven speed control system using wet well level and flow rate. During storms, the flow through the treatment plant ranged from 12 to 13.5 MGD.	Four VFD-driven vertical turbine pumps lift the screened wastewater to the vortex grit removal tanks. Each pump is rated at 15 MGD and the pump discharge rate is determined by wet well level as measured by a pressure transducer. All flows into the treatment plant are screened and receive grit removal prior to diversion, if required, to the diurnal storm basin [SEE FLOW CONTROL]
Flow Control; two trunk sewers feed the treatment plant: a 54-inch sewer and a 72-inch sewer.	Dry Weather: all flows from the 54-inch sewer passed through the two smaller bar screens. All flow in the 72 inch sewer entered the 54-inch sewer by a 30-inch connecting pipe. Light Wet Weather: Flows entered treatment plant in same manner, but as wet well level reached a set point, the speed controller was taken over by an automatic gain control module, which strived to maintain a constant discharge flow rate ranging from 12 to 13.5 MGD. Excess flows were diverted to the diurnal storm basin by the second and/or third pump.	Dry Weather: all flows from the 54-inch sewer pass through bar screens 1 & 2. All flow in the 72 inch sewer enters the 54-inch sewer by a 30-inch connecting pipe. Light Wet Weather: All flows enter treatment plant in same manner and after passing through the vortex grit tanks flow to a new primary splitter box. Flow to the primary clarifiers is measured at this box and when that flow exceeds 15 MGD, a step modulated slide gate opens incrementally to maintain 15 MGD to the primary clarifiers. The gate is controlled by a programmable logic controller (PLC), which modulates the gate until the influent flow drops below 14 MGD.

Improvement	Old Headworks	New Headworks
Flow Control; two trunk sewers feed the treatment plant: a 54-inch sewer and a 72-inch sewer.	Moderate to Severe Storms: as wet weather flows increased, the level in the 54-inch sewer would rise and overflow a weir to the third bar screen and aerated grit chamber, but not until the 54-inch sewer was surcharged (full). Flows to the treatment plant were limited by charging a pneumatic pinch valve that could partially or completely close the connection between the 72 and 54-inch sewers, thereby diverting all flow in the 72 inch sewer to the center storm basin. If the level continued to rise in the 54, eventually an overflow weir would divert untreated sewage to Trail Creek.	Moderate to Severe Storms: To prevent surcharging of the 54-inch sewer, the weir to the storm screen was removed and the wall was cut to the floor and a slide gate was installed. When the influent flow rate reaches 18 MGD OR the level differential between up and downstream of either bar screen exceeds 2 feet, the slide gate for the third bar screen automatically opens until the flow rate drops below 18 MGD. If the flow rate increases to 30 MGD or more, a modulating slide gate, which replaces the 30-inch pinch valve, closes incrementally to maintain the influent flow at 30 MGD. When that gate is partially or fully closed, a portion or all of the flow in the 72-inch sewer is diverted to the center storm basin. Both of the slide gates are controlled by the PLC.
	Semiautomatic control by flow rate and level for diurnal diversion, and manual control for 72-inch diversion.	Fully automatic flow control through PLC.
Main Switchgear	Two banks of switchgear with an automatic transfer switch from primary to secondary feed. Auto transfer switch could only be used manually. Equipment was over 20 years old.	Two banks of switchgear with a functioning automatic transfer switch from primary to secondary feed. Reliability of new equipment permitted the removal of the emergency plant bypass overflow weir.

The main advantages of the new headworks are reliability in equipment and power; automatic flow control, with redundant control sensors; elimination of artificial backups in the 54-inch trunk sewer that were created by the hydraulic design of the old headworks; and maximization of flows through the treatment plant prior to diversion to the storm water basins.

As stated, as a result of the new bar screens and removal of overflow weirs at the end of the old grit channels and prior to the storm bar screen, the normal level of wastewater in the 54-inch trunk sewer dropped significantly. This created two opportunities: first, the ability to determine if a diurnal pattern exists at the treatment plant for dry weather periods; and

second, if said pattern exists, to use the diurnal pattern to assist in evaluating the potential impact of wet weather events.

~~6.3.2.1 Dry Weather Flow Patterns (1990 Submittal; 1.5.1, 1996 Revision)~~

~~6.3.2.2 Wet Weather Flow Patterns (1990 Submittal; 1.5.2 1996 Revision)~~

~~6.3.2.2.1 ***Phase I*** ***Light Wet Weather Events*** (1.5.2.1, 1996 Revision)~~
~~6.3.2.2.2 ***Phase II*** ***Moderate Wet Weather Events*** (1.5.2.2, 1996 Revision)~~
~~6.3.2.2.3 ***Phase III*** ***Heavy Wet Weather Events*** (1.5.2.3, 1996 Revision)~~
~~6.3.2.2.4 ***Phase IV*** ***Return of Flow to WWTP*** (1.5.2.4,1996 Revision)~~

[This change replaces section 6.3.2, page 6-6 of the 1990 submittal; and 1.4 and 1.5 of the 1996 Revision.]

~~6.4 Treatment Plant Facilities~~ *[Eliminated]*

7.0 Combined Sewer Models

The modeling that was completed for the approved CSOOP was valid for that time period and led to the mid-1980's upgrade of the treatment plant and various sewer separation projects. The most recent modeling effort was conducted in 2003for Cheney Run storm sewer drainage basin in preparation for separation of the combined sewers in the Lafayette-Barker area of Michigan City.

[This change replaces section 7.0, page 7-1 of the 1990 submittal.]

~~7.1 General~~
~~7.2 Overflow Modeling~~
~~7.2.1 Storm Analysis~~
~~7.2.2 Loading Analysis~~
~~7.3 Trail Creek Simulation~~
~~7.3.1 Stream Modeling~~
~~7.3.2 Stream Purification Characteristics~~
~~7.3.3 Re-aeration Coefficient~~
~~7.3.4 De-oxygenation Rate Coefficient~~
~~7.3.5 Nitrogenous BOD Removal Rate~~
~~7.3.6 Benthic Demand Rate~~
~~7.4 Flow Monitoring~~
~~7.4.1 General~~
~~7.4.2 Overflows Prior to Project~~
~~7.4.3 Overflows After the Project~~
~~***7.4.3.1*** Treatment Plant~~
~~***7.4.3.2*** Fourth Street Box Overflow~~
~~7.4.4 Analysis of Results~~

7.1 Trail Creek Dissolved Oxygen Sag

Prior to 2004, the Sanitary District's NPDES permit had daily minimum dissolved oxygen limitations which varied from 5.0 mg/l to 13.0 mg/l depending on the time of the year. These limits were based on a Wasteload Allocation Study conducted by HydroQual, Inc. for the Indiana State Board of Health, Division of Water Pollution Control dated November 1982, which determined that the minimum water quality criteria for dissolved oxygen were not being met at least 35% of the time in Trail Creek downstream from the Sanitary District's POTW. At that time there were approximately 23 CSOs discharging to Trail Creek, and flows to the treatment facility above 12 MGD received primary treatment and were bypassed to the chlorine contact tank. Flows above 20 MGD completely bypassed the treatment plant. It was determined that an advanced treatment facility would be needed to meet water quality criteria in Trail Creek. However, because of large amounts of Sediment Oxygen Demand (SOD) in Trail Creek from the CSOs and bypasses, and due to the fact that Trail Creek is a cold water fishery, additional dissolved oxygen was required in order to meet the water quality criteria. The current advanced treatment facility was constructed in 1986 with an oxygen supersaturation system which was used from June thru September annually when the daily minimum dissolved oxygen limit was 13.0 mg/l as a daily minimum average.

Prior to the Headworks Project, the Michigan City Sanitary District had eliminated all but two CSOs to Trail Creek and had significantly reduced wet weather discharges from the treatment facility, thereby eliminating the source of the SOD that was identified as the cause of the dissolved oxygen impairment. The treatment plant is now actually producing an effluent that is as good or better than the background concentration for BOD_5, ammonia-nitrogen and TSS. The $CBOD_5$ effluent concentrations are typically less than 2 mg/l, whereas the modeled concentration is 5 mg/l. Trail Creek is not listed in the 2006 303(d) list of Impaired Water Bodies in Indiana for dissolved oxygen or impaired biotic communities. The December 31, 2001 WLA study evaluated the present instream quality for dissolved oxygen and determined that an effluent limitation of 7.0 mg/l year round should be sufficient to maintain compliance with the water quality criteria. Therefore, the dissolved oxygen sag for Trail Creek, as reported in the approved CSOOP, no longer exists.

[This change replaces section 7.1-7.4, page 7-1 of the 1990 submittal]

8.0 Regular Maintenance Program

8.1 General

The Sanitary District of Michigan City has instituted a regular maintenance plan as part of its operational plan to insure that the integrity of the sewer system is maintained. The Sanitary District shall maintain records and ~~are in the process of developing~~ appropriate forms for the specific duties. ~~A preventative maintenance schedule is presently being formulated with the following areas definitely identified:~~

[This change replaces section 8.1, page 8-1 of the 1990 submittal]

8.2 Sewer System Inspections

~~The Michigan City Sanitary District presently utilizes a foreman to constantly inspect the sewer system for potential problems and then to schedule work crews.~~ ***The SOP for sewer system inspections is found in Appendix D***

[This change replaces section 8.2, page 8-1 of the 1990 submittal]

8.3 Sewer System Controls

The Sanitary District of Michigan City utilizes ~~two types of sewer system controls. The Fourth Street Box Storm Sewer has side-spill weirs to allow the sanitary sewers to flow into it. The Sanitary District is presently designing a permanent metering and sampling facility at the overflows to monitor on a continuous basis the effects of these weirs. It is anticipated that the weirs will be raised after enough data is accumulated. The other type of sewer system control is~~ motor operated gates and valves at the treatment plant. These facilities are maintained ~~on a preventative maintenance schedule~~ by the treatment plant personnel. The maintenance department at the treatment facilities consists of ~~a foreman and three workers~~ ***four maintenance mechanics who report directly to the Assistant Plant Superintendent.***

[This change replaces section 8.3, page 8-1 of the 1990 submittal]

8.4 Catch Basin Cleaning

~~The Michigan City Sanitary District has one crew which only does manhole and catch basin cleaning. The crew utilizes a vactor truck which vacuums materials from manholes and catch basins. All catch basins and manholes in Michigan City are cleaned on a 1-1/2 year cycle as part of a preventative maintenance schedule. Catch basins and manholes in areas of combined sewers and especially at the Fourth Street Box area, where CSO's may occur are cleaned on a much more frequent schedule. These areas are cleaned on as recent as a two week schedule to a 6 month schedule. Currently, the preventative maintenance is carried out on a non-formal written basis. The Michigan City Sanitary~~

~~District does plan to initiate a written schedule which will be input into the treatment plant computer. The computer will then print out daily schedules to personnel.~~
See section 2.2.4 for procedures.

[This change replaces section 8.4, page 8-1 of the 1990 submittal]

8.5 Sewer Flushing

~~The Michigan City Sanitary District currently has two crews and two sewer jetting trucks which continuously flush sewers in Michigan City. One crew cleans sewers on a continuous preventative maintenance basis from one end of the City to the other. The other crew spends all of its time on emergency calls or high solids accumulation areas, as combined sewer areas .~~ ***See Section 4.4 for procedures.***

[This change replaces section 8.5, page 8-2 of the 1990 submittal]

8.6 Lift Station Maintenance

The Sanitary District of Michigan City ~~presently has a lift station mechanic, helper and plant electrician which continuously~~ ***maintenance staff*** maintains the lift stations on both an emergency and preventative maintenance basis. ~~Each lift station is inspected daily unless emergency problems prevent the personnel .~~ ***Lift stations have been assigned to four groups. Each group is scheduled for inspection a minimum of once every two weeks; therefore, each lift station is inspected once every eight weeks. The data from the inspection is entered into a database. Corrective maintenance is preformed on an as-needed basis, twenty-four hours a day.***

Physical inspections are primarily for wet well conditions, condition of pressure transducer and backup float switches, and general condition of the wet well.
The conversion of the lift station telemetry to real-time, with pump status and wet well level data has permitted the Sanitary District to reduce the frequency of scheduled inspections.

[This change replaces section 8.6, page 8-2 of the 1990 submittal]

8.7 Manhole and Catch Basin Repair

~~The Michigan City Sanitary District has a work crew which does only manhole and catch basin repairs. This crew repairs those structures, raises the structures when required and replaces inlets when necessary. The Michigan City system is aging and this work has become a necessary task for the District.~~ ***See section 2.2.4 for catch basin repairs and section 2.2.1 for manhole repairs.***

[This change replaces section 8.74, page 8-2 of the 1990 submittal]

8.8 Street Cleaning

~~The Michigan City Street Department currently utilizes two street cleaning vehicles. During non-precipitation days from Spring through Fall, at least one city street sweeper is in operation and continuously cleans the City streets. Starting this year, the Street Department will utilize the second machine to clean the combined sewer areas on a more frequent schedule.~~ ***See Section 4.2 for street cleaning.***

[This change replaces section 8.9, page 8-2 of the 1990 submittal]

8.9 Industrial Source Control

Michigan City, through its industrial pretreatment ordinances and storm water detention ordinance, does not have a problem with flows from industries to the sewer system.

8.10 Rehabilitation of Sewers

~~The Michigan City Sanitary District has recently completed a sewer rehabilitation program. Numerous sections of sewers in Michigan City were sewer lined and manholes were grouted. This rehabilitation program followed an Infiltration\Inflow Analysis and Sewer System Evaluation Survey, which entailed flow gauging and internal television inspection. The result of the rehabilitation program is a sewer system with limited infiltration.~~ ***See Section 2.2.1***

[This change replaces section 8.10, page 8-2 of the 1990 submittal]

9.0 Control Strategy

9.1 Sewer System Controls

9.1.1 General

The Michigan City Sanitary District has instituted a regular maintenance plan as part of its operational plan to insure that the integrity of the sewer system is maintained. The Sanitary District shall maintain records and ~~are in the process of~~ develop~~ing~~ appropriate forms for the specific duties. ~~A p~~ ***P***reventative maintenance ~~schedule is presently being formulated with the following areas definitely identified:~~ ***activities have been discussed previously***.

[This change replaces section 9.1.1, page 9-1 of the 1990 submittal]

9.1.2 Sewer System Inspections

~~The Michigan City Sanitary District will utilize a foreman to constantly inspect the sewer system for potential problems and then schedule work for the crews.~~
See SOP in <u>Appendix D</u>

9.1.3 Overflow Maintenance

~~The Michigan City Sanitary District utilizes two types of sewer system controls. The Fourth Street Box Storm Sewer has side spill weirs to allow the sanitary sewers to flow into it. The Sanitary District is presently designing a permanent metering and sampling facility at the overflows to monitor on a continuous basis the effects of these weirs. It is anticipated that the weirs will be raised after enough data is accumulated. The other type of sewer system control is motor operated gates and valves at the treatment plant. These facilities will be maintained on a preventative maintenance schedule by the treatment plant personnel. The maintenance department at the treatment facilities consist of a foreman and three workers.~~ ***This section is obsolete since all overflows have been eliminated in the collection system. An inspection program for sealed overflows is found in Sections 5.2.1.4 and 5.3.7.***

[This change replaces section 9.1.3, page 9-1 of the 1990 submittal]

9.1.4 Catch Basin Cleaning

~~The Michigan City sanitary District has one crew which will perform manhole and catch basin cleaning. The crew utilizes a vactor truck which vacuums materials from manholes and catch basins. All catch basins and manholes in Michigan City will be cleaned on a 1-1/2 year cycle as part of the preventative maintenance schedule. Catch basins and manholes in areas of combined sewers and especially at the Fourth Street Box area, where CSO's may occur will be cleaned on a much more frequent schedule. These areas will be cleaned on a monthly schedule. The Michigan City Sanitary District will be inputting into the treatment plant~~

~~computer the maintenance schedule. The computer will then print out daily schedules to personnel.~~ ***See section 2.2.4 for procedures.***

[This change replaces section 9.1.4, page 9-1 of the 1990 submittal]

9.1.5 Sewer Flushing

~~The Michigan City Sanitary District has two crews and two sewer jetting trucks which will continuously flush sewers in Michigan City. One crew will clean sewers on a continuous preventative maintenance basis from one end of the City to the other. The other crew will spend all of its time on emergency calls or high solids accumulation areas, as combined sewer areas.~~ ***See section 4.4 for procedures.***

[This change replaces section 9.1.5, page 9-2 of the 1990 submittal]

9.1.6 Lift Station Maintenance

~~The Michigan City Sanitary District has a lift station mechanic, helper and plant electrician which will continuously maintain the lift stations on both an emergency and preventative maintenance basis. Each lift station will be inspected daily unless emergency problems prevent the personnel.~~ ***See section 8.6 for procedures.***

[This change replaces section 9.1.6, page 9-2 of the 1990 submittal]

9.1.7 Manhole and Catch Basin Repair

~~The Michigan City Sanitary District has a work crew which will only do manhole and catch basin repairs. This crew will repair those structures, raise the structures when required and replace inlets when necessary.~~ ***See Section 2.2.4 for catch basin repairs and Section 2.2.1 for manhole repairs.***

[This change replaces section 9.1.7, page 9-2 of the 1990 submittal]

9.1.8 Street Cleaning

~~The Michigan City Street Department utilizes two street cleaning vehicles. During non-precipitation days from Spring through Fall, at least one city street sweeper will be in operation and continuously clean the City streets. Starting this year, the Street Department will utilize the second machine to clean the combined sewer areas on a more frequent schedule.~~ ***See Section 4.2 for street cleaning***.

[This change replaces section 9.1.8, page 9-2 of the 1990 submittal]

9.1.9 Sewer Separation (1990 Submittal; 1.2, 1996 Revision)

The Sanitary District of Michigan City has been involved in an aggressive sewer separation plan for 25 years. ~~In the past ten years, the Sanitary District has spent approximately $ 1,000,000 per year towards sewer separation projects.~~ The Sanitary District will continue to separate sewers in the future ***as funding becomes available.*** Sewer separation not only reduces overflows but also increases the plant's available capacity.

[This change replaces section 9.1.9, page 9-2 of the 1990 submittal]

9.1.10 ***Pollution Prevention*** (1.0, 1996 Revision)

9.1.11 ***Elimination of Overflows*** (1.3 and 1.4, 1996 Revision)

All collection system overflows have been sealed or eliminated. The Grit Chambers Overflow Location (CSO Outfall 004) was eliminated during the 2005-06 Headworks Improvement Project. The only remaining CSO outfall is the discharge from the Storm Retention Basins (CSO Outfall 002A).

9.2 Treatment Plant

The Michigan City Wastewater Treatment Plant underwent ~~has recently undergone~~ a $ 25,000,000 expansion in the mid-1980's. As a part of that project, a detailed Operations and Maintenance Manual was prepared. ~~In this 0 & M Manual are preventative maintenance schedules. The maintenance schedules are being inputted into the treatment plant computer by use of "Operator 10". This is a software program used in the operation and maintenance of treatment plants. There is a maintenance foreman as well as three mechanics and four shift helpers to perform plant maintenance. Michigan City realizes the investment made into their treatment works and will be maintaining their equipment for a long, useful life. The Michigan City Wastewater Treatment Plant has effluent requirements among the most stringent in the Midwest. The new effluent parameters alone improve the water quality of thee receiving stream.~~

9.2.1 Headworks Improvements

In 2005-2006, the headworks of the treatment plant were rebuilt to improve wet weather flow distribution, replace failing bar screens and grit removal equipment, and to improve the main switchgear for the treatment plant. A comparison of the old and new headworks can be found in Section 6.3.2.

9.2.2 Flow Maximization

One of the nine minimum technology-based controls requires flow maximization through the wastewater treatment plant. As discussed previously, the treatment plant has an average daily design flow of 12 MGD and a peak hourly design flow of 15 MGD. The 2006 modification to the Sanitary District's NPDES permit requires maximization of flows prior to (or concurrent with) the diversion to the storm retention basins. The new headworks were designed to maximize flows through the treatment processes at the peak hourly design flow capacity. This is done automatically through a programmable logic controller (PLC) which reads the flow meter for the influent lift station and the flow measurement for the primary clarifier influent and adjusts modulating gates to maintain the average flow to the primary clarifiers at 15 MGD whenever the influent lift station flow exceeds that for rate. Figure 9-1 illustrates that the modulating gates maintain an average of 15 MGD during storm events and while the stored flow in the Storm Retention Basins are returned to the treatment plant headworks.

9.2.3 ***Effluent Outfall 001 Discharge Data Analysis*** (1.6.3 & 1.6.4, 1996 Revision)

As a result of maximization, the through flow through the treatment plant exceeds the average daily design flow for extended periods. Therefore wet weather events potentially have an impact on treatment efficiency. The following table summarizes the treatment capacity of each of the treatment stages.

TREATMENT UNIT	"Ten States" STANDARD[1]	STANDARD VALUE	MCSD VALUE	MAXIMUM FLOW FOR UNIT PER STANDARD (MGD)
Climber Bar Screens				35.0
Pista Grit Channels				60.0
Influent Lift Pump				45.0
Primary Clarifiers	Surface overflow rate (SOR) @design flow tanks not receiving activated sludge gpd/sq ft	1,000	1,423	**8.4**
	SOR @design peak hourly flow tanks not receiving activated sludge	1,500	1,779	**12.7**
	SOR @design peak hourly flow tanks receiving activated sludge	1,200	1,779	**10.1**
Aeration Tanks	Organic Loading for extended aeration – single stage nitrification lbs BOD/d/1000 cu ft	15	**13 @ 7.7 MGD** **20 @ 12 MGD** **25 @ 15 MGD**	**14.0**
	F/M Ratio Lb BOD/d/lb MLVSS	0.05 – 0.1	0.055	
	MLSS (mg/l)	3,000 – 5,000	3,556	
Secondary Clarifiers	Extended aeration – single stage nitrification SOR gpd/sq ft	1,000		19.0
	Activated sludge w/chemical addition for phosphorus removal	900		17.1
Tertiary Sand Filters	Hydraulic loading gpm/sq ft	2.5-5.0 [1]	3.2 @12 MGD 3.9 @15 MGD	19.0 SOLIDS DEPENDENT

[1] Manufacturer's criteria.

Flows to the primary clarifiers that exceed 8 MGD also exceed the design capacity flow for that treatment unit. The secondary treatment unit has some excess capacity and therefore, can absorb the effects of less efficient primary treatment. One might expect the secondary and tertiary treatment stages to be strained under these conditions. However, the following table summaries the treatment efficiencies for total suspended solids (TSS), biological oxygen demand (BOD5), ammonia as nitrogen, and total phosphorus for January 2006 through December 2007.

[1] Recommended Standards for Wastewater Facilities, 1997 Ed., Great Lakes-Upper Mississippi Board of State and Provincial Public Health Environmental Managers, Health Education Services, Albany, NY.

Flow to Primary Clarifiers	<8 MGD MASS Lbs/Day	<8 MGD % Removal	8-12 MGD MASS Lbs/Day	8-12 MGD % Removal	>12 MGD MASS Lbs/Day	>12 MGD % Removal
TSS						
Influent	5,947		6,773		10,939	
Primary Effluent	2,791	53%	3,710	45%	5,304	52%
Secondary Eff.	341	41%	550	47%	1,017	39%
Final Effluent	117	4%	162	6%	437	5%
Overall Removal		98%		98%		96%
BOD5						
Influent	6,507		7,269		8,418	
Primary Effluent	4,242	35%	4,837	33%	5,821	31%
Secondary Eff.						
Final Effluent	106	64%	153	64%	294	66%
Overall Removal		98%		98%		97%
Ammonia-N						
Influent	697		770		777	
Primary Effluent	748	-7%	849	-10%	896	-15%
Secondary Eff.	12	106%	12	109%	25	112%
Final Effluent	6	1%	7	1%	15	1%
Overall Removal		99%		99%		98%
Total Phosphorus						
Influent	163		184		220	
Primary Effluent	132	19%	156	15%	177	20%
Secondary Eff.	35	60%	47	59%	67	50%
Final Effluent	29	4%	37	5%	56	5%
Overall Removal		82%		80%		75%

Clearly, the secondary and tertiary stages have been able to provide consistent treatment for elevated flows through the plant.

9.2.4 Storm Basin Performance (1.6, 1996 Revision)

~~When the level of the storm water in the basins reaches a certain level nearing capacity, the aeration system stops. This allows the basins to become a settling tank for the wastewater prior to overflowing to Trail Creek. It is felt that the stormwater basins actually perform as a treatment process. Reduction in ammonia is experienced due to aeration and the settling process removes BOD, suspended solids and phosphorus.~~

When the influent lift station flow exceeds 15 MGD, but is less that 30 MGD, diversions to the storm retention basins occur at the new primary splitter box via PLC modulated gate valves. Those diversions are sent to the Diurnal Basin (see Figure 9.2).

When the influent lift station flow exceeds 30 MGD, then a gate on the 30-inch sewer connect the 72-inch trunk sewer with the 54-inch trunk sewer will modulate to limit the flow through the influent lift station to 30 MGD. Flows diverted by the closing or partial closure of that gate, will be sent to the storm water control building for screening and discharge to storm basin #1.

When the diurnal basin reaches capacity, it will overflow into storm basin #1. Similarly, when basin #1 reaches capacity, it will overflow into storm basin #2.

When the wastewater level in the diurnal basin covers the aeration header, the shift operator will manually turn on the blower to the diurnal basin. Similarly, the blowers for the aeration headers in storm basin #1 and #2 are turned on when the wastewater level in the respective basin covers the header. If the level in storm basin #2 reaches within one foot of the discharge weir to the disinfection chamber, then the operator will turn off the blower for storm basin #2 and permit that basin to act as a settling chamber.

Once the storms have ended, and the plant influent pump station flow drops to 14 MGD, a modulating plug valve on the 12-inch return opens to permit automatic drainage of the storm basins to the plant headworks. The valve step modulates to maintain the influent pump station flow at 14 MGD. If that flow rate increases above that set point, the valve will close and the PLC will monitor the flow rate until it drops below the set point.

9.2.4.1 Overflow Occurrences (1.6.1, 1996 Revision)

When storm basin #2 reaches the overflow weir to the disinfection chamber, the chamber fills and the wastewater overflows into a rectangular channel leading to a 96-inch diameter discharge pipe to Trail Creek. Table 9.1 lists the wet weather events for January 2006 through February 2008 that resulted in a significant use of the storm basins and/or a discharge from Outfall 002A. Of the fifty-two (52) significant events, only six (6) resulted in a CSO discharge. Note that the time required to empty the storm basins from the end of the storm varies widely over these events.

9.2.4.2 Disinfection

The Sanitary District agreed to construct a disinfection chamber for storm basin #2 and the discharge through Outfall 002A. The basin was designed to disinfect a maximum flow of 10 MGD for discharges of secondary treatment quality or 5 MGD for untreated wastewater. Disinfection is required for discharges from April 1st through October 31st. The disinfection chamber hold 0.118 million gallons and flow is measured as the wastewater enters the disinfection chamber. When the disinfection chamber was constructed, the flow meter range was calibrated from 0 to 114 MGD. Therefore, since dry weather discharges from the storm basin are prohibited, each discharge event became a means for adjusting the disinfection system. These adjustments were made based on results of the previous storm

Storm #1 07/27/2006 - First storm with disinfection: chlorinator started just before discharge from chamber, chlorinator set to 300 lbs/day due to flow range.

Storm #2 09/13/2006 - Chlorinator started as soon as wastewater entered disinfection chamber; chlorinator set to 300 lbs/day.

Storm #3 04/25/2007 – Disinfection drain valves opened to equalize level with rest of basin #2; chlorinator started when wastewater rose to within 1 foot of overflow weirs to disinfection chamber; chlorinator set to 300 lbs/day.

Storm #4 08/25/2007 – same procedure as with Storm #3; failed to adequately disinfect; had flow meter manufacturer in to recalibrate range to 0-25 MGD.

Storm #5 01/7/2008 – no disinfection required; ran system in automatic feed mode with newly calibrated flow meter; system set to initial feed rate of 350 lbs/day.

Storm #6 01/10/2008 – No disinfection required; had annual system check in March 2008 and set up chlorine and sulfur dioxide feed for dual tanks in order to increase dosage during next storm.

9.3 NPDES Requirements (1.6.2, 1996 Revision)

See Table 2.4 for NPDES Permit limits for plant effluent (Outfall 001B) and storm basin outfall (002A).

9.4 Sampling and Flow Monitoring (1.7 & 3.0, 1996 Revision)

Storm basin influent flows are monitored in two places: the Primary Splitter Box Diversion and the 72-inch trunk sewer as it enters the Storm Basin Control Building. The former is measured by the difference between the plant influent pump station flow (48-inch magnetic flow meter) and the flow to the primary clarifiers (rectangular weir). The latter is measured by a velocity-cross section area meter. Return flow from the storm basins is measured by a 12-inch magnetic flow meter. Outfall 002A discharge flows are measured by a V-notch weir (0-5 MGD) and a rectangular weir (5-25 MGD) minus the volume of the disinfection chamber for the initial discharge date.

Actual plant influent flow is the sum of the 48-inch magnetic flow meter, the 12-inch storm return mag-meter, and the 72-inch velocity-cross sectional area flow meter. Flows to the WWTP for treatment are measured by the rectangular weir at Primary Splitter Box.

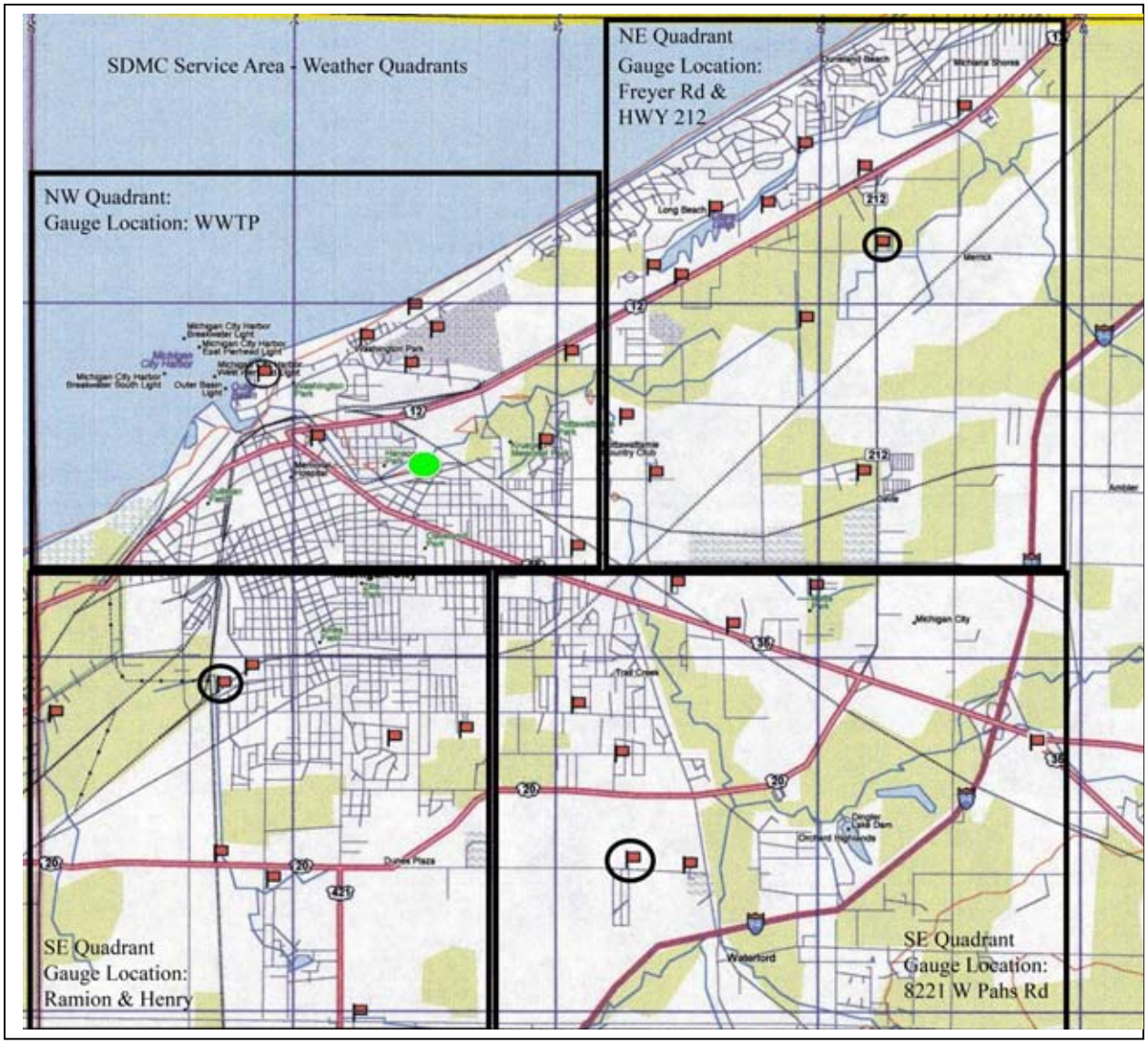
Sampling requirements and frequency for the treatment plant are found in Table 2.4. All samples for Outfall 002A are grab samples once per day in accordance with Attachment A of the 2006 NPDES Permit Modification.

9.5 Protocol (3.1, 1996 Revision)

Samples for Outfall 002A are taken within two hours after discharge begins. E. coli and chlorine residual samples are taken from April 1st through October 31st at two locations: immediately before the discharge from the disinfection chamber, and at the end of the rectangular channel just before the discharge flow enters the 96-inch diameter discharge pipe to Trail Creek. The former is for operational control and the latter is for NPDES Permit monitoring. All other permit parameters are sampled at the latter location. Samples for the second, third, etc day of discharge are taken during the normal day-shift (7:00 am to 3:00 pm) in the morning. Dissolved oxygen data is collected in the field with a YSI dissolved oxygen meter. All samples are held and preserved in accordance with 40 CFR Part 136.

9.6 Rainfall Event Monitoring (3.1.4, 1996 Revision)

Rain gauges capable of measuring 0.01 inch of precipitation are located in the four quadrants of the Sanitary District service area and at the treatment plant, see Figure 9-3. All rain gauges are equipped with heaters. A full weather station is located at the treatment plant for other weather data. All weather data is downloadable.



9.7 ***CSO Outfall 002A Discharge Data Analysis*** (1.6.3 & 1.6.4, 1996 Revision)

Table 9.2 contains the data collected for Outfall 002A discharges from January 2000 through March 18, 2008.

9.8 Observation and Reporting of Adverse Effects (3.1.5 & 3.1.6, 1996 Revision)

All data for Outfall 002A are reported to the Indiana Department of Environmental Management monthly. All data within Table 9.2 meets acute water quality criteria for protection of Aquatic Life. Some the E. coli data exceeds the daily maximum limitation for protection of Full-Body Contract Recreation in Trail Creek. Efforts to bring the E. coli data into compliance are discussed in Section 9.2.4.2.

9.9 Public Notification (2.0, 1996 Revision)

The public is notified at the earliest Sanitary District Board of Commissioners meeting, and at the next scheduled meeting. A representative of the local newspaper is generally present at the meeting. Board meetings are recorded and available to the public at the following web site: http://www.alco.org/alcotv.html

9.10 Signage (2.1, 1996 Revision).

As seen in the following photograph, signage at Outfall 002 identifies the discharge as a CSO outfall.

9.11 Public Hearing (2.2, 1996 Revision)

No public meetings have been held between 2000 and 2007 for CSO issues.

10.0 Schedule of Activities and Conclusions

10.1 Schedule (1990 Submittal; 3.1.7, 1996 Revision)

See Section 4.5

[This change replaces section 10.1, page 10-1 of the 1990 submittal]

10.2 Conclusions

See Section 4.5

[This change replaces section 10-2, page 10-1 of the 1990 submittal]

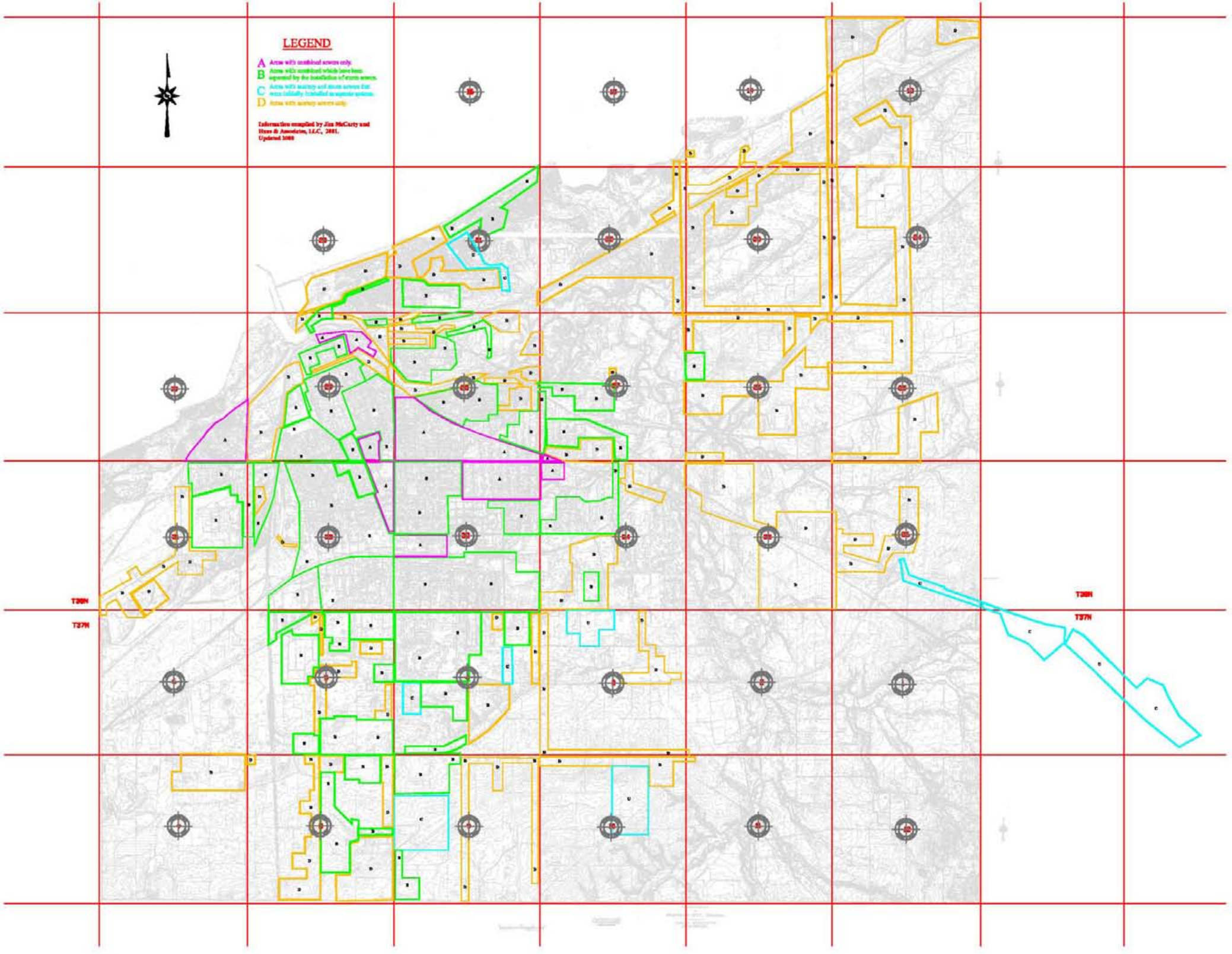
APPENDIX B

Plot of Remaining Combined Sewered Areas

Sewer Areas for Michigan City, IN

Section #	Type A AC	Type B AC	Type C AC	Type D AC	Total Section Area AC	Area w/o Sanitary AC
1	0.0	0.0	0.0	0.0	0.0	640.0
2	0.0	0.0	0.0	0.0	0.0	640.0
3	0.0	0.0	38.5	101.8	140.3	499.7
4	0.0	250.4	26.9	74.8	352.0	288.0
5	0.0	239.1	0.0	54.9	294.0	346.0
6	0.0	0.0	0.0	0.0	0.0	640.0
7	0.0	0.0	0.0	75.1	75.1	564.9
8	0.0	107.8	0.0	203.1	310.9	329.1
9	0.0	90.5	88.2	74.2	252.9	387.1
10	0.0	0.0	74.0	53.1	127.1	512.9
11	0.0	0.0	0.0	0.0	0.0	640.0
12	0.0	0.0	0.0	0.0	0.0	640.0
13	0.0	0.0	0.0	156.2	156.2	483.8
14	0.0	0.0	0.0	73.9	73.9	566.1
15	0.0	0.0	0.0	0.0	0.0	640.0
16	0.0	0.0	0.0	0.0	0.0	640.0
17	0.0	0.0	0.0	0.0	0.0	640.0
18	0.0	0.0	0.0	0.0	0.0	640.0
19	0.0	0.0	0.0	0.0	0.0	640.0
20	0.0	4.0	0.0	68.3	72.3	567.7
21	0.0	99.5	29.6	85.2	214.3	425.7
22	0.0	0.0	0.0	157.9	157.9	482.1
23	0.0	0.0	0.0	238.3	238.3	401.7
24	0.0	0.0	0.0	191.5	191.5	448.5
25	0.0	0.0	0.0	141.7	141.7	498.3
26	0.0	16.0	0.0	205.3	221.3	418.7
27	1.6	91.4	0.0	38.9	132.0	508.0
28	149.5	188.8	0.0	114.5	452.9	187.1
29	30.0	297.5	0.0	120.9	448.4	191.6
30	65.6	0.0	0.0	0.0	65.6	574.4
31	0.0	152.9	0.0	111.0	263.9	376.1
32	33.6	456.3	0.0	8.2	498.0	142.0
33	121.3	407.6	0.0	0.0	528.9	111.1
34	11.5	91.3	0.0	105.5	208.3	431.7
35	0.0	0.0	0.0	322.2	322.2	317.8
36	0.0	0.0	17.8	84.2	102.0	538.0
Area SE of 36	0.0	0.0	161.7	0.0	161.7	478.3
TOTAL	**413.2**	**2493.2**	**436.6**	**2860.8**	**6203.8**	**17476.2**
					LEGEND	
% OF TOTAL AREA	**6.7**	**40.2**	**7.0**	**46.1**	Type A	Combined only
					Type B	Combined Sewers now separated
CURRENT % SEPARATED SEWER AREA	**93.3**				Type C	Sanitary and Storm installed at the same time.
					Type D	Sanitary only

INFORMATION COMPILED BY
JIM McCARTY AND HAAS ASSOCIATES, LLC, 2001.
UPDATED 2008 BY HAAS ASSOCIATES


LEGEND
A Area with combined sewers only.
B Area with combined which have been separated by the installation of storm sewers.
C Area with sanitary and storm sewers that were initially installed as separate systems.
D Area with sanitary sewers only.
Information compiled by Jim McCarty and Hess & Associates, LLC., 2001. Updated 2008
T28N
T27N
T28N
T27N

APPENDIX C

Table of Pipe Sizes, Material and Age

SANITARY DISTRICT OF MICHIGAN CITY

TO: Mayor Sheila Brillson
Chuck Oberlie, Controller
Bill Phelps, City Engineer

cc: Dan Olson
Mike Hoffman
Doretha Sanders
Bob Sutherlin

FROM: Al Walus, General Manager

DATE: August 12, 2002

RE: Sewer Inventory

For GASB 34 and other reasons, the Sanitary District has been utilizing in-house staff resources to update our overall sewer inventory. The District's 1990 Combined Sewer System Operational Plan identified our "Sewer System Inventory" as consisting of:

Combined & Sanitary Sewer Inventory -- 1990 Data
2,247 man-holes, and
583,179 feet of sewers; this equates to 110.45 miles of sewers

Examining the tabular data from the 1990 report, the sewer inventory described appears to be combined sanitary/storm sewers and sanitary only sewers. Thus, reviewing Project Manuals for sanitary sewer extension projects constructed since the 1990 report, the updated 2002 sanitary sewer inventory is as follows:

Combined & Sanitary Sewer Inventory -- 2002 Data
2,737 man-holes, and
721,879 feet of sewers; this equates to 136.72 miles of sewers

Since the above data does not contain storm sewers, we reviewed our Sewer Atlas to scale the lineal feet of storm sewers in our storm water sewer system. Once we obtained this initial data, we again reviewed Project Manuals and Final Payment certified as-built sewer lengths to construct our overall storm sewer inventory as follows:

Storm Sewer Inventory -- 2002 Data
899 man-holes, and
213,293 feet of sewers; this equates to 40.40 miles of sewers

Adding together our 2002 Combined/Sanitary Sewers and Storm Sewers, our total sewer inventory is:

Total Combined/Sanitary & Storm Sewer Inventory -- 2002 Data
3,636 man-holes, and
935,172 feet of sewers; this equates to 177.12 miles of sewers

NOTE: While the sewer inventory does not include each and every sanitary sewer project completed since 1990 or each and every storm sewer in Michigan City, we believe this is a documented baseline point from which we will continue to update as time permits in the coming months. (Note: Sewer length spreadsheets are attached for information.)

Sanitary District of Michigan City: 1100 E. Eighth Street, Michigan City, IN 46360-2567 · Phone: (219) 874-7799 · Fax: (219) 874-8053
Refuse Department: 1801 Kentucky Street, Michigan City, IN 46360-4144 · Phone: (219) 873-1530 · Fax: (219) 873-1565

Sanitary District of Michigan Sanitary Sewer Inventory as of 2002 (includes combined sewers and sanitary only sewers, but not storm sewers) by: AJW; 8/12/2002

System Name	No. of Man-holes	Length of Sewer in Feet														
		6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	36"	42"	48"	66"	72"
A5	76	0	940	9,465	8,125	905	0	0	0	0	0	0	0	0	0	2,365
A14	91	0	0	6,065	10,725	645	118	0	3,795	0	0	0	1,955	1,325	1,645	0
A20	23	0	0	925	130	0	0	0	1,234	0	0	0	2,330	0	0	0
A30	18	0	0	1,760	1,370	0	0	0	0	0	0	1,690	270	0	0	0
A34	39	0	0	1,280	5,000	1,675	1,020	520	0	125	400	1,190	0	0	0	0
AN8	87	0	660	5,120	12,105	1,485	515	0	0	0	135	505	1,935	0	0	0
AN20	54	2,515	1,105	12,370	0	0	945	0	0	0	1,605	0	0	0	0	0
AN28	47	0	7,660	3,635	760	2,280	620	0	1,810	0	0	0	0	0	0	0
ANM2	20	0	1,590	1,930	500	575	430	0	0	0	0	0	0	0	0	0
ANZ26	40	0	0	815	525	100	7,940	0	2,385	0	0	0	0	0	0	0
AQ6	64	0	1,060	5,470	6,000	1,610	690	595	1,370	0	0	0	1,320	255	0	0
AQ13	166	0	805	23,505	14,375	4,905	775	720	0	0	830	1,435	860	0	0	0
AQ26	54	0	640	8,960	1,860	1,505	445	620	1,165	0	425	0	0	0	0	0
AQ34	88	0	355	5,635	11,035	3,510	5,110	0	0	0	0	0	0	0	0	0
AQ59	14	0	0	0	3,560	0	0	0	0	0	0	0	0	0	0	0
AQW2	14	0	0	2,680	1,030	0	0	0	0	0	0	0	0	0	0	0
AQZ46	30	0	0	0	6,345	1,420	0	0	0	0	0	0	0	0	0	0
AU5	41	0	1,760	2,270	4,690	0	1,105	1,144	1,000	0	0	0	0	0	0	0
AU16	42	0	0	6,340	2,560	2,590	965	0	0	0	0	0	0	0	0	0
AUM2	26	0	630	920	5,925	0	0	0	0	0	0	0	0	0	0	0
AUM23	35	0	620	620	5,680	2,170	910	1,660	0	0	0	0	0	0	0	0
AW5	54	0	170	5,181	7,840	1,260	0	0	0	0	1,580	0	0	0	0	0
AW14	6	0	0	0	1,860	0	0	0	0	0	0	0	0	0	0	0
AZ4	47	0	1,585	2,810	2,410	2,730	1,585	0	2,125	0	0	0	0	0	0	0
AZ19	18	0	55	345	4,540	0	0	0	0	0	0	0	0	0	0	0
AZF6	14	0	740	1,120	0	0	1,710	0	0	0	0	0	0	0	0	0
AZJ6	92	0	2,980	14,565	5,885	420	0	0	0	0	0	0	0	0	0	0
B1	68	0	1,710	6,250	4,200	230	0	1,040	0	0	0	4,030	0	0	0	0
B28	44	0	210	1,940	3,255	2,043	1,040	0	300	2,715	0	0	0	0	0	0
B15B	15	0	1,040	450	0	0	1,660	0	530	210	0	60	0	0	0	0
B41B	48	0	605	4,870	3,850	355	550	0	2,130	0	0	0	0	0	0	0
BC1	137	0	2,965	4,160	2,650	6,380	4,310	5,945	5,395	2,340	0	1,395	0	0	0	0
BC13	19	0	0	2,900	990	0	0	0	320	0	0	660	0	0	0	0
B16	65	0	0	2,680	11,310	1,850	270	0	550	0	270	0	0	0	0	0
BF1	34	0	0	1,620	1,590	820	1,160	2,075	0	1,385	0	0	0	0	0	0
BL1	20	0	0	0	5,240	0	0	0	0	0	0	0	0	0	0	0
BT2	185	0	665	1,025	1,310	220	0	0	860	735	0	0	0	0	0	0
BT7A	16	0	120	0	2,760	0	1,150	0	0	0	0	0	0	0	0	0
BTC12B	14	0	0	0	200	0	2,040	0	800	0	640	0	0	0	0	0
C3	53	0	3,420	4,619	1,450	300	1,540	2,300	0	0	0	0	0	0	0	0

Sanitary District of Michigan Sanitary Sewer Inventory as of 2002 (includes combined sewers and sanitary only sewers, but not storm sewers) by: AJW; 8/12/2002

System Name	No. of Man-holes	Length of Sewer in Feet														
		6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	36"	42"	48"	66"	72"
CD2	16	0	0	1,910	0	0	2,340	0	0	0	0	0	0	0	0	0
CD10	67	0	390	11,840	7,685	1,040	3,480	1,140	0	0	0	0	0	0	0	0
CF1	19	0	0	0	2,280	1,905	640	0	0	0	0	0	0	0	0	0
CF11	13	0	320	340	600	2,170	0	0	0	0	0	0	0	0	0	0
CF22	69	0	4,760	7,560	2,600	2,920	0	0	0	0	0	0	0	0	0	0
CFD1	29	0	0	4,515	3,015	0	0	0	0	0	0	0	0	0	0	0
A4	16	0	290	3,300	0	0	0	0	0	0	0	0	0	0	0	0
Freyer	12	0	0	0	1,206	2,770	0	0	0	0	0	0	0	0	0	0
Woodlawn	51	0	9,370	0	3,100	2,640	0	0	0	0	0	0	0	0	0	0
212/Lumber	10	0	135	3,147	0	0	0	0	0	0	0	0	0	0	0	0
Shor/Mich	132	0	18,263	2,288	9,219	0	0	2,218	0	0	0	0	0	0	0	0
Crescent	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/Freyer	35	0	1,127	3,789	1,924	0	0	3,845	0	0	0	0	0	0	0	0
Eastwood	13	0	2,221	0	4,000	0	32	0	0	0	0	0	0	0	0	0
Roeske N.	7	0	153	0	1,127	0	0	0	0	0	0	0	0	0	0	0
Roeske S.	10	0	916	740	0	0	1,095	0	0	0	0	0	0	0	0	0
Motts I	81	0	9,620	3,083	6,750	1,845	0	2,789	0	0	0	0	0	0	0	0
Motts II	14	0	0	1,768	2,548	958	0	0	0	0	0	0	0	0	0	0
Burnside	14	0	590	118	1,877	0	0	0	0	0	0	0	0	0	0	0
212/12	17	0	455	100	4,956	0	0	0	0	0	0	0	0	0	0	0
South Side	89	0	5,633	354	1,498	0	3,886	2,012	6,307	1,256	2,638	0	2,334	0	0	0
Totals:	2,737	2,515	88,333	199,152	218,025	58,231	50,076	28,623	32,076	8,766	8,523	10,965	11,004	1,580	1,645	2,365

Thus, through 2002, our **sanitary sewer** inventory has identified: 2,737 man-holes; and 721,879 feet of sewers; which equals: 136.72 miles of sewers

Sanitary District of Michigan City Storm Sewer Inventory as of 2002

by: AJW; 8/12/2002

System Name	No. of Man-holes	Length of Sewer in Feet																							
		8"	10"	12"	15"	16"	18"	21"	24"	25"	27"	30"	33"	36"	42"	48"	54"	60"	66"	72"	78	84	96	102	108	10' x 8'
Sht. 4	68			2,060	2,700	1,450	3,960	620	3,330					720	1,220	320	2,020	550	2,400							
Sht. 5	34	200	700	4,290																						
Sht. 27	46			1,970	2,630	0	870	810	910	370	530	1,240		1,360	0	1,840										
Sht. 28	63			700	1,600	0	620	380	1,320	0	470	770		920	1,920	2,520	300		1,130							
Sht. 29	88		1,230	2,390	2,030	0	1,630	290	1,950	0	0	1,740		1,550	430	430	860	1,700	1,050	2,850						2,480
Sht. 30	23			1,000	0	0	380	0	820	0	1,700	910							600	1,300						
Sht. 31	45		350	1,640	410	0	2,140	0	1,060	0	0	1,230		920	0	160	0	0	890							
Sht. 32	86			2,220	1,980	0	1,990	550	3,680	0	260	2,010	1,430	2,340	300	780	1,150	820		660	5,730	2,070	910	1,450	2,250	
Sht. 33	56			1,270	940		270	1,070	250			790		260	1,440	2,370				1,900						
Sht. 34	11				290											2,170										
Pullman	37	226	2,112	1,472	1,611		2,192	1,857	276		404			273	272	559										
Jackson/Cool	11			673			60		310			545		741	825											
Southwood/VG	31		700	685	1,300		300	638	2,566			1,515		1,460												
Village Road	7		441	157	637			157	109																	
Harr/Hoyt I	14	15	750	286	81		240		312			1,735				694										
Harr/Hoyt II A	27	226	1,499	915	2,450		1,166	516	638		668	624		629	384											
Harr/Hoyt II B	24		1,101	1,691	861		528	906	292			1,044														
Harr/Hoyt II C	3		413	155	659			461																		
Harrison	3	151	66		123		271																			
School St.	59	4,330	1,698	1,406	457		1,170	486	1,345		1,052	167		929	1,562											
Sheridan Bch.	27		1,282	1,231	2,172		1,290	263	482		30	184				488										
Ohio/Barker	48			5,609	4,014	65	2,933																			
Ohio/Garfield	13		1,938	1,304	1,562			367	388			377														
Mich/Porter	13		206	434	100		124		87		1,939															
Roeske North	8	32		305	504		286	332	61																	
Roeske South	12			1,873	1,121																					
S-Side IV	31		1,430	546	2,218		2,848	466	1,144		358															
S-Side II	8		210		507			485									1,299									
S-Side I	3		170	73			262		464																	
Totals:	899	5,180	16,296	36,355	32,957		25,530	10,654	21,794		7,411	14,881		12,102	8,353	12,331			6,070							2,480

Thus, through 2002, our **storm sewer** inventory has identified: 899 man-holes and 213,293 feet of sewers; which equals: 40.40 miles of sewers

CITY OF MICHIGAN CITY
Riverboat-Funded Storm Sewers through 2005

System Name	No. of Man-holes	Length of Sewer in Feet										
		8"	10"	12"	15"	16"	18"	21"	24"	25"	27"	30"
Ohio/Barker	48	0	0	5,609	4,014	65	2,933	0	0	0	0	0
Ohio/Garfield	13	0	1,938	1,304	1,562	0		367	388	0	0	377
Roeske North	8	32	0	305	504	0	286	332	61	0	0	0
Roeske South	12	0	0	1,873	1,121	0	0	0	0	0	0	0
Wabash Phase I	3	40	658	347	460	0	255	0	0	0	0	0
Totals:	84	72	2,596	9,438	7,661	65	3,474	699	449	0	0	377

With Riverboat funding, Michigan City has built: 84 man-holes; and,

24,831 feet of sewers, or: **5** miles of storm sewers

by: Sanitary District of Michigan City
April 2005

APPENDIX D

Standard Operating Procedure CM-2

Standard Operating Procedure for:
PM.2 Manhole Inspection

Date Approved:

Purpose of SOP:

To accurately inventory the assets of the collection system, to update collection system maps, to determine the structural condition of each manhole and associated piping, and to aide in the scheduling of our system maintenance and repair

PM.2.1. **Frequency:** Ten year revolving program. (10 % per year)

PM.2.2. **Safety:** Use proper Personal Protective Equipment. Use appropriate traffic safety controls.

PM.2.3. **Documentation:** Use Form MI-1 or GPS database.

PM.2.4. **Equipment needed:**

1. Camera Truck and or Envirosight Camera and associated hardware/software.
2. Trimble GeoXH Handheld GPS with Zephyr Antenna and associated hardware/ software.
3. Vehicle for portable power (generator truck)
4. Standard Hand and or power Tools
5. Jet/Vac truck to clean manhole if necessary
6. Any other equipment deemed necessary to complete the job.

PM.2.5. **Manpower:** At least one certified video person and one or more additional crew to be determined by the Foreman

PM.2.6 **Scope of Work:**

Field Operations Supervisor and Collections Foreman will make a weekly list of manholes to be inspected.

Set up the GeoXH Handheld GPS equipment at the manhole to be inspected and use according to the manufacturer's specifications.

Clean manhole if necessary to get view of walls and invert etc.

Set up the Envirosight and or Camera Truck at the manhole to be inspected and use according to the manufacturer's specifications.

Using the form MI-1, circle the appropriate box, fill in the blanks and or write applicable comments in the space available.

Using the GPS equipment, go to the manhole number in the database and enter the comments using the dropdowns and stylus.

The foreman will determine if immediate repairs are necessary. If major repairs are necessary, the Field Operations Supervisor and the Collections Foreman will meet with the Collections Superintendent to determine the next course of action.

PM.2.7
Responsibility for Collected Data:

1. Trained Video Employee: will download images from camera to storage. (weekly)
2. IT Manager will download Portable Camera video and download the GPS information. (as necessary)
3. Field Operations Supervisor and Collections Foreman will review & analyze data for future maintenance.

Appendix:

A. MI-1 Form
B. What to look for sheet (memory jogger).

MANHOLE DESCRIPTION – Form MI - 1

MANHOLE # : _____ DATE: _____

ADDRESS / LOCATION: _____

AREA AROUND ENTRANCE: _____ ACCESS: _____

RING & COVER: ALUM. CAST IRON

RISER RINGS: BRICK CONCRETE STEEL

MH TYPE: PRECAST BRICK

STEPS: PVC ALUM. CAST IRON

DOWNSTREAM PIPE TYPE: PVC CLAY CONCRETE

INVERT SIZES IN: _____ INVERT SIZES OUT: _____

DEPTH TO INVERT: _____

MANHOLE CONDITION

RING & COVER: OK BURIED CHIP OUT

RING & COVER OFFSET INCHES: _____ REPLACE: _____

RISER RINGS: OK GROUT REBUILD

MANHOLE WALLS: OK GROUT REPAIR

STEPS: OK RUSTY GONE

INVERT: OK CHIP OUT REWORK

THROUGH FLOW: SMOOTH TURBULENT SURCHARCHING

INFIL: NONE LIGHT MEDIUM HEAVY

ROOTS: NONE MEDIUM HEAVY SEVERE

CORROSION: NONE SLIGHT MODERATE SEVERE

GENERAL CONDITION: GOOD FAIR POOR CRITICAL

COMMENTS: _____

_____

_____

MEMORY JOGGER

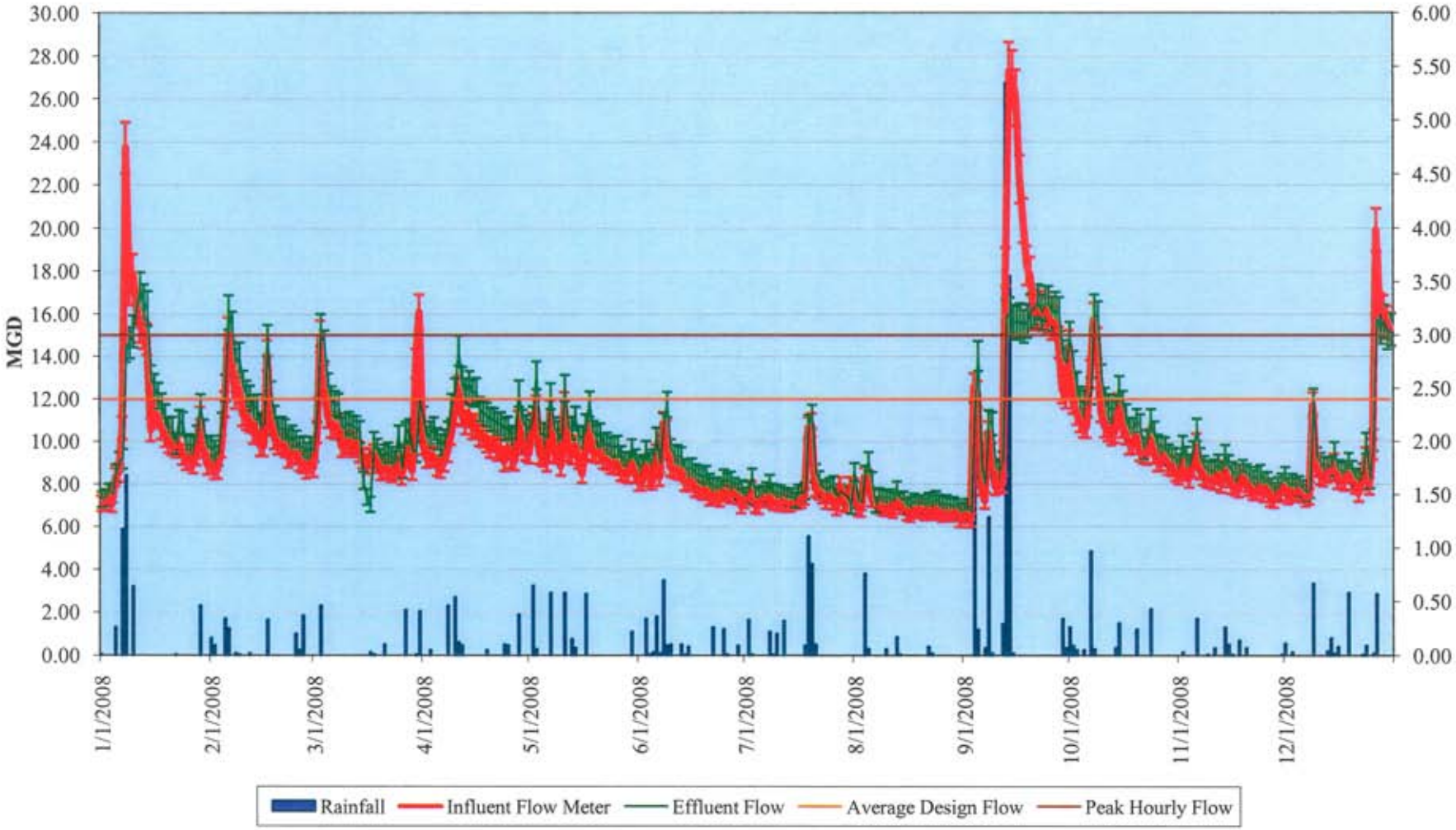
Manhole Inspection:
What to look for

- Buried Manholes
- Accessibility
- Frame and cover setting
- Mineral deposits, infiltrations, or inflow
- Roots
- Structural problems, such as grade ring condition
- Deterioration of manhole or pipes
- Pipeline capacity
- How invert and bench affect through-flow
- Strong or unusual odors
- Rough or turbulent water surface
- Noisy wastewater

APPENDIX E

WWTP Influent and Effluent Flows versus Rainfall for 2008

APPENDIX E
2008 Flow Comparison: Influent vs. Effluent
(with 5% error bars)



APPENDIX F

2008 Lift Station Status Report

Appendix F

Memorandum

Date: June 6, 2008, Updated February 6, 2009

To: Alan J. Walus, General Manager

From: Daniel R. Olson, Plant Superintendent
Randy Hocutt, Asst. Plant Superintendent

Subject: Lift Stations Status Report

The Sanitary District is entering the fourth year for conversion from AT&T to Mission Communications. There are fourteen existing lift stations that need to be converted to Mission Telemetry and new control systems. Unfortunately, some of those lift stations cannot be converted without a major upgrade. This creates a perfect opportunity to assess the condition of existing lift stations and document needs and problems.

Beachwalk LS (123 Beachwalk Lane): The lift station telemetry was converted to Mission in 2007 and is located in generator zone 1; see Appendix I for generator zone map. Due to its location, this lift station receives seasonal loading variations that contribute to the problems experienced there. The Sanitary District monitors and maintains this lift station through a loose, informal agreement with Beachwalk Development. In 2005, District representatives met with Tom Moss, Beachwalk Development, which resulted in the overhaul of the lift station electrical system and installation of a grinder pump at Beachwalk's expense. While the power systems were updated to accommodate a second grinder pump, the purchase of the second pump was held in abeyance, by mutual agreement, until such time that the development warranted its installation. That time has arrived, both from a development perspective and by the need for a true duplex lift station with alternating lead pump capabilities. The current grinder pump periodically experiences clogging by excessive debris, and the current lag pump cannot pass the debris and becomes plugged and trips out from over current almost immediately. The District has requested that Haas and Associated, LLC, the engineering firm that designed the sewer system and participated in the first pump replacement and electrical upgrade, contact Beachwalk Development and inform them of the District's desire to have the second pump replaced. In return, the District has agreed to formally accept the lift station as a District responsibility. This process is ongoing.

Beechwood LS (Intersection of Shady Lane & Warnke Road): This lift station is scheduled for conversion from AT&T to Mission in 2008 and is located in generator zone 2. No problems are experienced at this lift station.

Birch Tree Farms LS (205 Birch Tree Farms): This lift station was converted to Mission in 2007 and is located in generator zone 3. The location, behind a private residence, and accessible only from a golf cart path, is not ideal but workable. Early indications form the Mission

generated data indicate that this lift station experiences wet weather influences, especially in larger storms (>1.0 inch), see Appendix II. No corrective actions are recommended at this time.

Broadway LS (Intersection of Broadway Street and Roeske Ave): This lift station is scheduled for conversion to Mission in 2009 and is located in generator zone 1. Currently, the lift station is located in the roadway and the control panel is located in Water Tower Park. GAF Corporation has approached to Sanitary District to accept all once-through cooling water, currently recycled and disposed of offsite. The estimated flow is 140,000 gpd. The lift station has two pumps each rated at approximately 140,000 gpd. Current actual flow is estimated at 92,000 gpd. This means that more than one pump would be required to accommodate the anticipated extra flow from GAF. Because this removes the safety margin, should a pump fail, the Plant personnel have denied the acceptance of the additional GAF flow. While pump reliability is generally good at this lift station, even without the extra flow, the lift station has significant problems. Access to the pumps is through a heavy duty vault cover, which is required for the traffic on Broadway Street. Access to pumps is limited, which together with traffic makes maintenance activities difficult. The lift station has no extra conduits for control wiring, thus conversion to Mission will require new conduits between the control panel and the manhole-wet well. Based on all of these factors, the lift station should be relocated to the Water Tower Park and upgraded to accommodate extra flow from GAF.

Clark LS (922 W. US Highway 20): This lift station was converted to Mission in 2005 and is located in generator zone 4. When Clark Lift Station was last upgraded, approximately 2000, significant infiltration/inflow (I/I) was observed by District personnel, the contractor and engineer. Between October 2000 and the date of this summary, the discharge force main has ruptured four (4) times. Investigation of the I/I was established as a goal for the Collection System area for 2008. Mission data indicates that rain events exceeding one (1) inch have an observable I/I impact, while smaller rainfall events have less impact, see Appendix III. Currently, the collection system for this lift station will be expanded to the west (Palatek Project) and further expansion, i.e. the Pine School Project, is in the planning stages. This lift station needs to have the discharge force main replaced and a permanent standby generator installed prior to completion of the Pine School Project.

Coolspring & Roeske LS (1899 E. Coolspring): This lift station was converted to Mission in 2005 and is located in generator zone 2. The control panel for the lift station needs to be rehabilitated. Currently, the pumps cannot operate in alternating lead pump mode. Consequently, the majority of the run time is for pump 2.

Eastwood LS (418 Eastwood Road): This lift station is scheduled for conversion to Mission in 2008 and is located in generator zone 3. No significant problems have been experienced at this lift station.

Edgewood LS (Garrettson and Maple): This lift station was converted to Mission in 2006 and is located in generator zone 1. During dry weather, this station experiences frequent pump starts for short duration. On May 25, 2008 (seventh day without precipitation), the lift station had 144/143 starts for an average run time of 1.0/0.8 minutes for pump 1/pump 2, respectively.

There are some wet weather influences observed at this lift station, see Appendix IV; but the impacts are not uniform suggesting that there is a baseline I/I problem that does not exist in colder weather. This lift station needs to have the run time extended, preferably by adjustment of stop/start levels, if possible. Also, despite being located in generator zone 1, this lift station frequently loses power during major storms and should have a permanent standby generator installed.

Evergreen LS (607 Pinetree Drive): This lift station was converted to Mission in 2006 and is located in generator zone 3. The lift station needs to be replaced with a standard lift station. Currently, the pumps cannot operate in an alternating lead pump mode. Consequently, all run time is by pump #2. Wet weather influences have been observed at this lift station, but are less severe than others, see Appendix V. Of more concern is the use of this lift station during expansion of its service area, whether to the south or into the Town of Trail Creek.

Fourth Street LS (At 4th Street, East of Michigan Blvd): This lift station was converted to Mission in 2006 and is located in generator zone 1. Last upgraded in 1984, the lift station primarily served the public housing complex that was removed several years ago. Currently, the lift station serves the area north of US Highway 12, primarily Taylor Street and E 2nd Street. The lift station is severely impacted by wet weather, see Appendix VI. The lift station is below ground with access to a lower level through a hatch. Access to the wet well and dry well is through separate access manholes in the lower level. Groundwater has flooded the dry well, making it more difficult to remove pumps for service or repair. Currently, pump 1 is the only pump in service and pump 2 is inaccessible. In order to make this station more service friendly, the top concrete slab needs to be removed and larger access hatches install over the two pumps at the lower level. Additionally, a new sump pump is required to dewater the dry well. Since this lift station only services users north of US Highway 12, and since the lift station will have to be removed if the North Side Development Project proceeds, the better alternative is to replace the lift station with a small package plant located north of US 12 and closer to the area served.

Freyer Road LS (Intersection of Freyer Road and State Road 212): This lift station was converted to Mission in 2005 and is located in generator zone 4. Until just recently, this lift station was severely impacted by wet weather. This year, manholes in a marsh area were sealed and this work seems to have eliminated the major portion of the I/I. Once the first large storm occurs this assumption can be verified, see Appendix VII. Other than past I/I problems, this list station does not have major problems. However, due to its location, a permanent standby generator should be installed at this lift station. **UPDATE**: On September 13-14, 2008 a 100-year storm hit SDMC's service area. During this storm, the lift station did experience extended pump runs on September 14th. The wet well level reached a maximum of 8.57 feet for the two day period with a total rainfall of 8.34 inches at the lift station. In comparison, for a eight day period, August 18-25, 2007, the wet well level reached 18.3 feet and remained high for days. This confirms that the I/I BMPs were effective at this lift station.

Glenbrook LS (4998 Pahs Road): This list station is scheduled for conversion in 2009 and is located in generator zone 4. There are very few users connected to this lift station. However, the discharge force main is currently being used by Meadowdale LS. No problems exist at this lift

station that require attention. Due to the low number of connected users, this lift station does not require a standby generator at this time.

Golfview LS (307 Golfview Road): This lift station was converted to Mission in 2006 and is located in generator zone 3. In 2007, both pumps failed at the lift station and needed replacement. ITT Flygt Corporation was able to supply to comparable single-phase pumps. After extended problems with the power converter, the lift station has had not further problems. The required capacity, in conjunction with the single phase power available, makes it difficult to obtain suitable replacement pumps. The preferred power source for this lift station would be three-phase. However, due to the distance to the nearest three-phase power source, the power converter remains the most viable option. At this time, the station is rated as guardedly adequate. The lift station is monitored frequently since the home at the end of Golfview Road has been flooded by failure of the lift station several times. If three-phase power were closer, or if a lift station improvement project is initiated, then this option should be considered. This lift station should have its own standby generator due to power loss history, its difficult location for maneuvering a trailer-mounted generator, and the danger of backup into user homes.

Henry Street LS (Intersection of Henry Street and Bolka Avenue): This lift station is scheduled for conversion in 2009 and is located in generator zone 2. However, the lift station is located in the street and the control panel is located in the yard of a private residence on Henry Street. Conduits between the control panel and the wet well are deteriorating. The discharge piping in the manhole that serves as a wet well is disintegrating and needs to be replaced. This lift station is in worse shape than the old Washington Park Boulevard LS. The only solution for this lift station is to replace it with a standard lift station in another location. It is impractical to attempt to convert this lift station until it is relocated. In addition, the data that would be generated by Mission telemetry is crucial to evaluating this lift station for other problems, such as I/I.

Hidden Shores LS (2501 Fairway Drive): This lift station was converted to Mission in 2007 and is located in generator zone 3. There are very few pump starts at this lift station, usually no more that 3-4 starts per pump each day, and the pumps run for 4-6 minutes each start. There doesn't appear to be any I/I problems at the lift station. The control panel does need to be replaced and updated. Otherwise, there are no significant problems as this lift station.

Jackson Street LS (3011 Jackson Street): This lift station is scheduled for conversion to Mission in 2009 and is located in generator zone 2. This lift station has no significant history of alarms and therefore is considered adequate for its location.

Johnson Road LS (2908 E. Michigan Boulevard): This lift station is scheduled for conversion to Mission in 2009 and is located in generator zone 1. This lift station has no significant history of alarms, very few connected users, and therefore is considered adequate for its location.

Kieffer Road LS (400 N and Frontage Road): This lift station is scheduled for conversion to Mission in 2008 and is located in generator zone 4. However, the lift station is located adjacent to a service station and currently has single-phase power. Recent road construction has put this

lift station in danger from the weight of traffic. While the final position of the curb, in relation to the valve box, has not been determined, it will be close enough to inhibit easy access to the vault and blockage of traffic lanes, should maintenance be required. NIPSCO has been contacted regarding three-phase power (located one block west on Franklin Street (US 421). However, this lift station should be relocated as soon as possible. A connection permit for a third hotel was granted, although construction has not begun. Serviceability for this lift station after construction is completed will still be poor. Additionally, in the last seven years, both pumps at this lift station have failed simultaneously and have been replaced twice. Finally, the relocation must include a standby generator due to the number of affected users (three hotels) and location in zone 4.

Kimball Woods LS (2406 Duneland Drive): This lift station was converted to Mission in 2005 due to numerous problems with pump blockage by debris. The lift station is located in generator zone 4. The service area is seasonally impacted, but not impacted by wet weather. Users frequently flush disposable diapers into the collection system, which eventually clog the pumps. This requires the removal of the pump, physical removal of the debris and return of the pump to the wet well. Prior to the conversion to Mission, alarms would be received with no measure of severity. The Mission telemetry has allowed informed decision-making regarding callout of maintenance personnel and severity of the problems. However, the basic problem with debris remains. Consequently, the Sanitary District has contracted Haas & Associates LLC to design an upgrade to the pumps, controls and power equipment to permit the purchase and installation of two grinder pumps at this lift station. This work is ongoing and projected for completion in 2008. A standby generator should be added to the project.

Krueger School LS (Intersection of Karwick Road and Springland Avenue): This lift station was converted to Mission in 2005 and is located in generator zone 1. However, due to the design of the Mission M800 unit, only eight (8) digital inputs and two (2) analog inputs were available. Since the lift station has four (4) pumps, all of the DIs were used for monitoring pump status, i.e. RUNNING/OFF and NORMAL/FAIL for each pump. The lift station's physical configuration consists of two eight (8) foot diameter wet wells, interconnected by one 24-inch diameter, four (4) foot long steel sleeve, and two 6-inch diameter pipes. The wet wells are 29.43 and 30.00 feet deep. The bottom invert of the 24-inch sleeve is 1.41 feet above the shallow wet well, and the bottom inverts of the 6-inch pipes are located at the bottom of the shallow wet well. The wet wells have an N-S orientation and pumps 1 and 2 are in the south wet well, and pumps 3 and 4 are in the north wet well. Pumps 1-3 are valved to discharge through a 14-inch ductile iron force main, while pump 4 is valved to discharge through an 8-inch transite force main. Both force mains connect at a manhole in the SE corner of the intersection of Springland Ave and Roeske Avenue, before continuing via a 24-inch ductile iron sewer to the intersection of Calumet Avenue and Holiday Street. In 2008, the 8-inch transite force main developed at leak where it crosses Trail Creek. The emergency repairs were made immediately, without any discharge to the creek.

This lift station has eight (8) existing lift stations upstream, as indicated in the following diagram.

Due to this hierarchy, in 2008 a second M800 unit was ordered and the District is in the process of programming the two Mission units to receive data from each wet well separately. Ultimately, there will be a pressure transducer in each wet well, with separate high and low level alarms. By separating the wet wells, it is allows the District to monitor power at the station directly, and to provide the status of the backup float system.

In addition, due to the upstream load, each pump has 47-50 start/stop cycles each day and the run time lasts between 2 – 3 minutes of pumps 1 - 3 and 6 – 9 minutes for pump 4 , which discharged through the old eight-inch force main. For the last twelve billing periods, the lift station averaged 357 KWH/day, at an average cost of $34.13 per day. Electrical costs were higher during wet months than dry month. This is a good indication of I/I problems upstream. Actual pump start charts for north wet well pumps 1 and 2 (formerly pumps 3 and 4) are found in Appendix VIII.

This lift station should be rehabilitated. Pumps should be operated with variable frequency drives to reduce demand costs associated with pump starts. Mission is currently developing a larger real-time unit that will permit add-on modules for additional DI and AI inputs. This should be considered in the future. Additionally, due to the size of the pumps and lift station importance, a separate standby generator should be installed at this lift station, despite its location in generator zone 1.

Lake Avenue LS (Lake Avenue and Lakeshore Drive): This lift station was converted to Mission in 2006 and is located in generator zone 1. The lift station was rehabilitated in 1984. The lift station consists of a metal can wet well and valve box in the roadway, with the control panel off to the side in a parking lot. This lift station should be relocated and built as a standard lift station. The lift station has serviceability problems and is beginning to show signs of deterioration in the metal walls and roadway support. Two lift stations are located upstream, Beachwalk and Smith Valley. Because of the hierarchy, a standby generator should be included in the relocation.

Lake Hills LS (111 Timm Ct): This is a new lift station built in 2007 and equipped with Mission telemetry from startup. The lift station is located in generator zone 1 has its own permanent standby generator due to power outage problems with the lift station that it replaced and delays is having permanent power installed by NIPSCO. The lift station operates well and no problems are experienced at this lift station.

Lakeland Triangle LS (410 Martin Luther King Drive): The lift station is scheduled for conversion to Mission in 2008 and is located in generator zone 2. This lift station is located in the roadway and the control panel is at the side of the road in front of a private residence. The owner of the residence complains frequently about the control panel. The wet well is six foot in diameter and has a Neenah R-1740-B cover that weighs 240 lbs. The location of the lift station and accessibility to the wet well is limited. This lift station should be relocated and replaced with a standard lift station.

Liberty Trail LS (1100 Liberty Trail): The lift station is scheduled for conversion to Mission in 2008 and is located in generator zone 1. The lift station needs a new control panel but otherwise is in adequate condition.

Meadowdale LS (8221 W. Pahs Road): This lift station was converted to Mission in 2005 and is located in generator zone 4. The lift station was built in 2003 to replace the old inferior lift station. Since the first major storm in 2004, the lift station has not been able to operate as design due to excessive I/I, which has been thoroughly documented (also see Appendix IX). Further identification and elimination of the I/I sources is a specified goal for the Collection System personnel in 2008. When the lift station was relocated and built on the north side of Pahs Road, the opportunity to provide valving to interconnect the force main from Glen Brook LS to the old Meadowdale force main was seized and installed. Thankfully this was installed because the only way to operate this lift station is to redirect the discharge from Glen Brook LS into the wet well of Meadowdale lift station and to discharge through both force mains. The I/I problem must be resolved before either lift station receives any additional flow. Also, because of its location in zone 4, a standby generator should be installed at this location.

Menke Road LS (108 Menke Road): This lift station was converted to Mission in 2005 and is located in generator zone 4. The lift station was built in 1989 with a 12-foot diameter wet well and three pumps. The size of the wet well and pumps indicates that more flow was anticipated than current levels, approximately 50-75,000 gpd. The wet well is 23 feet deep. The pumps connect to 8-inch ductile iron discharge piping through longer than normal base elbow piping. These elbows position the pumps farther away from the wet well wall and allow the three to be positioned in a line. However, the elbows also make it very difficult to remove and replace the pumps, both due to the wet well depth and the position of the pumps in the wet well. Pump 2 failed in January 2008. All attempts to remove the pump for service have failed. Removing or returning a pump requires that the wet well be pumped down as far as possible and maintenance personnel perform a confined space entry. When the wet well is emptied, the temperature difference between the ambient temperatures can create a thick fog, which obscures vision. Fortunately, the pumps are oversized and the remaining two pumps can adequately handle the current flow rates. This station receives flow from US20-US35 LS, Beechwood LS, Golfview LS and a private lift station owned by Serenity Springs. Potential future development may include up to 1 MGD from LaPorte County through US20-US35 LS. In the event that the county does connect, then the pumps and controls should be re-evaluated at that time. However, regardless of the outcome of that connection, the lift station is located in generator zone 4 and should be equipped with a permanent standby generator.

Michiana Shores LS (107 Wildrose Drive): This lift station was converted to Mission in 2007 and is located in generator zone #4. Currently, the lift station pumps each run 2-4 times per day. The private 1000N sewer project is scheduled to discharge into this lift station's service area. When that project is complete, the lift station can be re-evaluated for upgrade needs. At this time, even though the lift station is in generator zone 4, there is no requirement for a standby generator.

Monon Ditch Stormwater LS (End of Circle on Ramion off of Henry Street): This lift station was converted to Mission in 2005 and is located in generator zone 2. The design of the lift station did not include lead pump alternation, so pump 1 is always in lead position. Pump 2 runs in moderate to heavy storms. This lift station can experience frequent power outages. Due to the size of the pumps, the larger trailer-mounted ONAN generator is required for this lift station during power outages. However, that same generator is required at the treatment plant if both power sources are lost. Therefore, changes are required at this lift station to avoid ponding of storm water in the streets and possible flooding of the neighborhood. Additionally, this lift station should have equipment for removal of floating debris (327 IAC 2-1.5-8, 327 IAC 15-13). Therefore, an improvement project for this lift station that includes the following is needed:

1. Coarse screening, preferably a climber screen with wash press;
2. Either an emergency wet well overflow discharge, if deemed hydraulically possible, or a permanent standby generator;
3. Upgrade of pump controls to permit auto alternation of the lead pump designation; and
4. Investigation into variable frequency drives to smooth out discharges and save on energy costs.

Ohio Street LS (Corner of Ohio Street at Southwind): The lift station is scheduled for conversion to Mission in 2009 and is located in generator zone 4. The wet and dry wells are located in the street on the east side of Ohio Street and require the shutdown of a lane of traffic in order to access the pumps. The control panel is located on the west side of Ohio Street near the drainage ditch and access road to the Michigan City Bakery. There are no extra conduits from the control panel to the dry well, which means that the Mission controls cannot be installed unless new conduits are core drilled under Ohio Street or the lift station is relocated and replaced with a standard lift station design. In the winter of 2007-2008, I&I issues with the Ohio Street sewer became evident during the unusual weather event of rapid melting of snow combined with heavy rain. In 2008, both pumps failed completely, requiring purchase of new pumps. Since the pumps are an unusual design, they were manufactured in Ireland and shipped by air freight to Michigan City. This lift station desperately needs the Mission SCADA to determine what other problems may exist. However, our recommendation is to do the following as soon as possible:

1. Conduct an engineering study for replacement of the culvert pipe that serves as the Ohio Street sanitary sewer under US20. During the study, determine if by adjusting the slope, this lift station can be eliminated.
2. If that study indicates that a lift station is still required, then relocate and replace this lift station with a standard lift station design, including a permanent standby generator.

UPDATE: Mission telemetry was added to this lift station in October 2008. In addition, the sewer system for the lift station and gravity sewers, which do not flow through the lift station, were smoke tested for I/I connections or sources. Engineering progressed in 2008 and funding was found to relocate this lift station and make improvements as required to redirect the gravity sewers and portions of the lift station sewer system to the new location. The discharge of the lift station is projected to connect to a different subsection of the collection system that has sufficient capacity. This will eliminate the problems with the culvert (see recommendation 1 above). The relocation and sewer work is scheduled for early 2009.

Pottawatomie Park LS (Intersection of Marquette and Warren): This lift station is scheduled for conversion to Mission in 2009 and is located in generator zone 1. This lift station goes into alarm whenever there is a rain storm greater than 0.5 inches. There is at least one street drain connected to this lift station, which probably accounts for the wet weather influence. A North Roeske sewer project, with a proposed new lift station is under development to provide sewers to the street that acts as a boundary between Michigan City and the Town of Pottawatomie Park. The design of the project would permit further sewer construction and the elimination of the existing Pottawatomie Park LS. This list station needs to be eliminated or replaced, and I/I sources need to be corrected.

Shoreland Hills LS (Intersection of Moore Road and Westwood Drive): This lift station was converted to Mission in 2007 and is located in generator zone 4. Either the pumps are oversized or the stop/start control set points need adjustment, since the average run time is 0.2-0.7 minutes (12 to 42 seconds). If the community of Duneland Beach were to install sewers, this lift station would receive the discharge. The lift station currently averages 30-34 pump starts for each pump per day. Other than the duration of run time, the lift station operation is adequate. Since the lift station is located in generator zone 4, it should have a standby generator installed, but is lower priority than other lift stations.

Sludge Lagoon LS (SDMC Sludge Lagoons): This lift station received an alarm system for the very first time, when a Mission unit was installed in 2007. The lift station is located in generator zone 1 and is low priority for response during a power outage. The lift station removes water decanted from the vactor truck debris removed from the sewers during cleaning operations, street sweepers emptying there sweepings, and removes storm water from the sludge storage lagoon to keep the storage sludge as dry as possible until removal in spring and fall. The lift station pumps are frequently plugged with debris from the vactor truck material, especially when the manual bar rack is lifted to drain the containment area. At this point no recommendations are made for the lift station, however; the District should consider a receiving station for the vactor truck material and street sweeper material.

Smith Valley LS (N end of Shawmut Drive, N of Lakeshore Drive): This lift station was converted to Mission in 2007 and is located in generator zone 1. This lift stations location makes cellular transmissions difficult, so to eliminate frequent loss of communication, a high-gain directional antenna was purchased and installed in 2008. This lift station needs to be rehabilitated, if not removed and rebuilt in the same location. Due to the location of this lift station, a package lift station with easy maintenance and standby generator may be considered.

Tall Timbers LS (922 Willow Spring Drive): This lift station is scheduled for conversion to Mission in 2008 and is located in generator zone 3. This lift station is located in the street with the control panel off the road in the adjacent right-of-way. The lift station has an especially heavy cover on the wet well that is difficult to remove. This lift station should be relocated out of the street.

Tinkers Dam LS (Corner of N Karwick Road and Shorewood Drive): This lift Station was converted to Mission in 2006 and is located in generator zone 2. The discharge piping was upgraded in 2006 to gain extra capacity for the new condominiums. There is some wet weather influence on this lift station, see Appendix X. Both pump have failed simultaneously twice in the last seven years. The last incident, November 2006, along with data from the Mission telemetry provided valuable data that permitted the use of a small portion of the influent sewer to extend the pump operating range. This reduced the average number of starts per day for both pumps from 271 to 175. Total run time for the lift station changed from 203 to 226 minutes per day. So, by using in-line storage the number of starts was decreased, and the run time was increased, both of which reduced wear and tear on the pumps. However, this also limits response time, since storage capacity in the line is limited. The other alternative is to install variable frequency drives on the pumps, however; the response time would still be limited. This lift station still needs to be rehabilitated. This will be especially urgent if new loadings occur, either through expansion of the condominium complex or additional service areas, such as Long Beach or the eastern end of Beachwalk Development. With extra loading a standby generator should be considered.

Tryon-Meer Road LS (Intersection of Tryon Road and Meer Road): This is a brand new lift station, built in 2006 with a Mission unit and located in generator zone 4. A standby generator was provided as part of the project. No problems have surfaced at this lift station and no further action is required at this time.

US 12 LS (3111 E. Dunes Highway): This lift station was converted to Mission in 2007 and is located in generator zone 2. There is some wet weather influence at this lift station, especially for larger storms, see Appendix XI. However, no significant problems exist at this lift stations that warrant attention at this time.

US20-US35 LS (South of US 20 and W of US 35 off the access road to Serenity Springs): This lift station was built in 2005 and has a modified Mission controller. The lift station is located in generator zone 4, and has a generator that was supplied as part of the project. This station operates well and needs no further attention until more users are connected. If LaPorte County does reserve capacity and constructs a main sewer line to the east, then capacity issues at this lift station may develop. There is a wet weather influence at this lift station that occurs well after the storm, see Appendix XII. This indicates that the I/I may be foundation drains and sump pumps rather that roof drains or other immediate impact sources. No actions are required at this time.

Washington Park Marina LS (Washington Park parking lot near marina): This lift station was converted to Mission in 2007 and is located in generator zone 1. This lift station has no wet weather influence, even with major storms. However, the lift station does lose power frequently during storms and often for extended periods. Because of the economic and recreational benefit of Washington Park, this lift station should have a standby generator installed. Otherwise, the lift station operation is adequate for the loading.

Woodlawn LS (2757 Mentor Avenue): This lift station is a few years old and scheduled for conversion to Mission in 2008. The lift station is located in generator zone 4 and is geographically segregated from other lift stations. For that reason and a frequent power outage history, the lift station should have a standby generator.

Summary & Prioritization:

The following chart summarizes the needs for the forty existing lift stations. Priority ratings are based on an ascending scale, with 0 being no need and 3 being a severe, immediate need.

Lift Station Name	Relocation-Replacement			Force Main	Pumps	Control Panel	Infiltration / Inflow	Generator Required	Priority
	Safety	Location	Condition						
Beachwalk[1]					3		0		3
Beechwood							?		0
Birch Tree Farms							1		1
Broadway	3	3	2			2	?		2
Clark				3			2		3
Coolspring & Roeske					2	2	1		2
Eastwood							?		0
Edgewood					2	2	2	3	2
Evergreen Plaza			3		2	2	1		2
Fourth Street	3	3	3		3	3	3	2	3
Freyer Road				1			2 [2]	3	2
Glen Brook							?		0
Golfview							1	3	2
Henry Street	3	3	3		3	3	?		3
Hidden Shores						2	0		2
Jackson Street							?		0
Johnson Road							?		0
Kieffer Road	3	3	3		3	3	?	3	3
Kimball Woods			2[3]		3	3	0	3	3
Krueger School	2		2	2	2	2	2	3	2
Lake Ave	3	3	3		3	3	1	3	3
Lake Hills							1		0
Lakeland Triangle	3	3	2		2	2	?		2
Liberty Trail						3	?		2
Meadowdale				3			3	3	3
Menke Road					2	1	2	3	2
Michiana Shores							0	1	1
Monon Ditch			3		3	3	NA	3	3
Ohio Street	3	3	3		2	2	3	3	3
Pottawatomie Park			3		3	3	3		3
Shoreland Hills							0	1	1
Sludge Lagoon							NA		0
Smith Valley	3	3	2		3	3	1	3	2
Tall Timbers	3	3	2		2	2	?		2
Tinkers Dam	2	2	2	1	1	2	2	2	2
Tryon-Meer							0		0
US 12							1		1
US 20-US 35							1		1
WP Marina							0	3	2
Woodlawn							?	3	2

NA = Not applicable, lift station is a storm station.

[1] Pump to be purchased and installed at Beachwalk Development's expense, i.e. no cost to Sanitary District.
[2] I/I may have been solved; we are awaiting the next large storm to evaluate fully.
[3] The condition of this lift station is marginal, but not expected to change at this time. Pump project is ongoing.

APPENDIX G

WWTP Performance Summary 2000-2008

APPENDIX G
Summary of WWTP Operational Data from 2000 through 2008

	Influent Flow [1]		Biochemical Oxygen Demand			Total Suspended Solids			Total Phosphorus			Ammonia-Nitrogen[2]		
	Avg. MGD	Peak MGD	Influent[3] mg/l	Effluent[4] mg/l	%Rem	Influent Mg/l	Effluent mg/l	%Rem	Influent mg/l	Effluent mg/l	%Rem	Influent mg/l	Effluent mg/l	%Rem
Design Criteria	***12.00***	***15.00***	***150***	***5.0***	***96.7***	***150***	***6.0***	***96.0***	***2.30***	***1.00***	***56.5***	***12.1***	***2.0/6.0***	***84.2***
Old Permit [5]	***12.00***	***15.00***		***5.0***			***6.0***			***<=1.00***	***>=80%***		***1.8/3.0***	
New Permit[6]	***12.00***	***15.00***		***5.0***			***6.0***			***<=1.00***	***>=70%***		***1.3/1.4***	
January	11.17	46.92	89	2.1	97.6	81	2.3	97.1	2.15	0.44	79.6	10.31	0.09	99.1
February	10.50	30.24	90	2.0	97.7	74	2.6	96.5	1.84	0.30	83.8	9.00	0.06	99.3
March	10.10	30.03	96	2.4	97.5	96	2.5	97.4	2.13	0.31	85.3	9.12	0.10	98.9
April	10.02	31.06	90	3.0	96.6	124	2.7	97.8	2.06	0.25	88.0	9.22	0.15	98.4
May	9.49	30.34	91	2.8	96.9	91	3.4	96.3	1.90	0.27	85.7	10.33	0.12	98.8
June	8.19	31.06	107	3.1	97.2	108	3.1	97.2	2.21	0.37	83.1	11.81	0.15	98.7
July	7.55	31.80	116	3.0	97.4	110	3.1	97.2	2.45	0.67	72.7	15.55	0.32	98.0
August	6.95	30.64	122	3.1	97.4	114	2.1	98.1	2.75	0.84	69.4	16.26	0.13	99.2
September	14.38	46.25	67	2.6	96.1	73	2.9	96.0	1.64	0.46	71.7	9.14	0.09	99.0
October	10.73	28.42	76	2.6	96.5	90	4.0	95.6	1.71	0.41	76.1	9.38	0.08	99.1
November	8.15	15.30	95	2.7	97.1	106	3.3	96.9	2.16	0.50	76.8	11.36	0.09	99.2
December	9.65	43.21	93	2.3	97.5	90	2.6	97.1	2.38	0.38	83.9	10.26	0.05	99.5
2008 Average	9.73		95	2.4	97.2	92	2.0	97.0	2.49	0.41	82.6	11.0	0.12	98.9
2007 Average	8.99		106	2.0	98.1	101	2.2	97.8	2.78	0.55	79.8	12.2	0.11	99.1
2006 Average	7.50		122	2.1	98.3	110	2.4	97.8	2.96	0.52	81.7	12.1	0.11	99.1
2005 Average	6.26		145	2.3	98.4	136	2.2	98.4	3.46	0.63	81.8	14.1	0.07	99.5
2004 Average	6.97		170	2.2	98.7	193	2.0	98.9	3.94	0.60	85.3	12.6	0.05	99.6
2003 Average	6.71		184	2.6	98.6	215	2.6	98.8	4.21	0.35	91.7	13.8	0.14	99.0
2002 Average	7.36		142	2.0	98.5	137	2.2	98.2	3.62	0.43	87.5	14.4	0.19	99.2
2001 Average	7.89		143	2.0	98.2	138	3.1	97.6	3.60	0.53	85.1	14.2	0.08	99.4
2000 Average	7.29		148	2.0	98.6	139	2.8	98.0	3.87	0.44	88.6	13.7	0.05	99.6

[1] Average Daily Design Flow/Peak Hourly Design Flow
[2] Summer/Winter Limits (Winter = December 1st through April 30th)
[3] Total Biochemical Oxygen Demand (5-day)
[4] Carbonaceous Biochemical Oxygen Demand (5-day)
[5] Old Permit in effect through October 2004
[6] New Permit in effect November 1, 2004

APPENDIX H

NPDES Permit and Modifications

APPENDIX I

Michigan City Ordinances

Appendix I – CSOOP Legal Review

From: David Payne [dpayne@braje-nelson.com]
Sent: Saturday, July 12, 2008 9:55 AM
To: Dan Olson
Subject: RE: CSOOP Review
Dan:

I have reviewed the CSOOP and I believe it meets the intent of the 1996 permit modification.

I note that the 1996 permit modification requires that for any new building connections to the combined sewer, storm water connections must be made separate and distinct from the sanitary connection. As I read the CSOOP, such a connection which allows storm water to the combined sewer would never be allowed. If there are exceptional circumstances which would call for such a connection, then the CSOOP should address the necessity of separate and distinct connections.

Give me a call if you wish to discuss this further.

Braje, Nelson, & Janes LLP

By: David K. Payne
126 E. 5th Street
P.O. Box 1006
Michigan City, Indiana 46361-8206
e-mail: dpayne@braje-nelson.com

APPENDIX J

Permitted Industrial Users and Discharge Characteristics

APPENDIX J
Waste Inc., 2008

FLOW		
Month	**Gallons**	**AvgDailyFlow**
Jan	512,740	16,540
Feb	476,760	16,440
Mar	520,490	16,790
Apr	497,400	16,580
May	515,530	16,630
June	450,000	15,000
July	367,040	11,840
Aug	419,740	13,540
Sep	424,500	14,150
Oct	389,980	12,580
Nov	366,600	12,220
Dec	401,760	12,960
TOTAL	**5,342,540**	**14,606**

APPENDIX K

Comparison of WWTP Effluent Monthly Average Flow and Peak Daily Flows
for 2006 through 2008

APPENDIX K
Monthly Average Effluent Flow Vs. Design Capacity

Month-Yr	Total Monthly Rainfall (inches)	Monthly Average Effluent Flow (MGD	Percentage of Plant Design Flow (12 MGD)	Percentage of Peak Hourly Design Flow (15 MGD)	CSO Discharge Event (Outfall 002A)
Jan-06	2.20	5.74	48%	38%	0
Feb-06	0.61	6.41	53%	43%	0
Mar-06	3.37	6.41	53%	43%	0
Apr-06	2.92	6.47	54%	43%	0
May-06	3.40	7.10	59%	47%	0
Jun-06	2.21	7.49	62%	50%	0
Jul-06	7.44	9.41	78%	63%	1
Aug-06	7.57	12.63	105%	84%	0
Sep-06	5.87	13.39	112%	89%	1
Oct-06	3.91	12.30	103%	82%	0
Nov-06	2.67	8.01	67%	53%	0
Dec-06	2.60	10.97	91%	73%	0
Jan-07	2.25	12.68	106%	85%	0
Feb-07	0.99	9.72	81%	65%	0
Mar-07	1.61	9.65	80%	64%	0
Apr-07	4.52	9.03	75%	60%	1
May-07	2.13	9.60	80%	64%	0
Jun-07	1.58	8.56	71%	57%	0
Jul-07	5.83	9.16	76%	61%	0
Aug-07	7.29	11.47	96%	76%	1
Sep-07	1.28	8.36	70%	56%	0
Oct-07	2.31	7.48	62%	50%	0
Nov-07	1.14	6.86	57%	46%	0
Dec-07	1.90	7.74	65%	52%	0
Jan-08	3.88	11.34	95%	76%	1
Feb-08	1.92	11.43	95%	76%	0
Mar-08	1.50	10.39	87%	69%	0
Apr-08	2.05	11.22	93%	75%	0
May-08	2.63	10.41	87%	69%	0
Jun-08	2.34	8.80	73%	59%	0
Jul-08	2.65	7.85	65%	52%	0
Aug-08	1.49	7.34	61%	49%	0
Sep-08	12.04	13.15	110%	88%	1
Oct-08	2.80	11.51	96%	77%	0
Nov-08	1.16	8.70	73%	58%	0
Dec-08	2.75	9.79	82%	65%	1
2006 Total	**44.77**				**2**
2006 Avg.		**8.86**	**74%**	**59%**	
2007 Total	**32.83**				**2**
2007 Avg.		**9.19**	**77%**	**61%**	
2008 Total	**37.19**				**3**
2008 Avg.		**10.16**	**85%**	**68%**	

APPENDIX L

Collection System Work Order Database Examples

All Streets: Work Order Summary Report

12/1/2007 From: 12/31/2007 To:

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
E 10th Street	***Block No.***		***700***											
Total Calls for Block: 1	0	1	0	1	0	0	0	0	1	0	0	0	0	0
W 10th Street	***Block No.***		***1100***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 2	1	1	0	2	1	0	1	0	1	0	0	0	0	0
E 11th Street	***Block No.***		***300***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
W 8th Street	***Block No.***		***1000***											
Total Calls for Block: 1	1	1	0	1	1	0	0	0	0	0	0	0	0	0
Total Calls for Street: 1	1	1	0	1	1	0	0	0	0	0	0	0	0	0
E 9th Street	***Block No.***		***300***											
Total Calls for Block: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Benton Street	***Block No.***		***600***											
Total Calls for Block: 1	0	1	0	0	1	0	0	0	1	0	0	0	0	0
Total Calls for Street: 1	0	1	0	0	1	0	0	0	1	0	0	0	0	0
Broadway Street	***Block No.***		***400***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Butler Street	***Block No.***		***200***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Calumet Avenue	***Block No.***		***0***											
Total Calls for Block: 2	0	0	0	0	0	0	0	0	0	0	2	0	0	0
N Calumet Avenue	***Block No.***		***100***											
Total Calls for Block: 1	1	0	0	1	0	0	1	0	0	0	0	0	0	0

All Streets: Work Order Summary Report

12/1/2007 From: 12/31/2007 To:

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
Total Calls for Street: 3	1	0	0	1	0	0	1	0	0	0	2	0	0	0
N Carroll Avenue	***Block No.***		***0***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Cleveland Avenue	***Block No.***		***0***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Columbia Street	***Block No.***		***200***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Decatur Street	***Block No.***		***600***											
Total Calls for Block: 1	1	1	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	1	0	1	1	0	1	0	0	0	0	0	0	0
Dunlap Street	***Block No.***		***100***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Dupage Street	***Block No.***		***600***											
Total Calls for Block: 1	1	0	0	1	0	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	0	0	1	0	0	0	0	0	0	0
Franklin Street	***Block No.***		***400***											
Total Calls for Block: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Franklin Street	***Block No.***		***600***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Calls for Street: 3	2	0	0	2	2	0	2	0	0	0	1	0	0	0
Hayes Avenue	***Block No.***		***400***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0

All Streets: Work Order Summary Report

12/1/2007

From: 12/31/2007 To:

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Holliday Street	***Block No.***		***0***											
Total Calls for Block: 1	1	1	0	1	1	0	0	0	0	0	0	1	0	0
Holliday Street	***Block No.***		***500***											
Total Calls for Block: 2	2	1	1	2	1	0	2	0	0	0	0	0	0	0
Total Calls for Street: 3	3	2	1	3	2	0	2	0	0	0	0	1	0	0
Karwick Road	***Block No.***		***100***											
Total Calls for Block: 2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Total Calls for Street: 2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Maple Street	***Block No.***		***500***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
McClelland Avenue	***Block No.***		***100***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
E Michigan Boulevard	***Block No.***		***800***											
Total Calls for Block: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Pearl Street	***Block No.***		***400***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Pine Street	***Block No.***		***700***											
Total Calls for Block: 1	0	1	0	1	1	0	0	0	0	0	0	0	0	0
Total Calls for Street: 1	0	1	0	1	1	0	0	0	0	0	0	0	0	0
Pleasant Avenue	***Block No.***		***500***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0

All Streets: Work Order Summary Report

12/1/2007 **From:** **To:** 12/31/2007

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Poplar Street	***Block No.***		***0***											
Total Calls for Block: 1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Total Calls for Street: 1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
N Porter Street	***Block No.***		***300***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
S Porter Street	***Block No.***		***400***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
N Ridgeland Avenue	***Block No.***		***500***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Salem Court	***Block No.***		***1000***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Southwood Drive	***Block No.***		***200***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Spring Street	***Block No.***		***1100***											
Total Calls for Block: 1	1	1	0	1	0	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	1	0	1	0	0	1	0	0	0	0	0	0	0
Springland Avenue	***Block No.***		***300***											
Total Calls for Block: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Tennessee Street	***Block No.***		***1300***											
Total Calls for Block: 1	1	0	0	1	0	1	1	0	0	0	0	0	0	0

All Streets: Work Order Summary Report

12/1/2007

From: 12/31/2007 To:

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
Tennessee Street	***Block No.***		***1700***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	1	1	2	0	0	0	0	0	0	0
Union Street	***Block No.***		***500***											
Total Calls for Block: 1	1	0	0	1	1	1	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	1	1	0	0	0	0	0	0	0
E ***US Hwy 20***	***Block No.***		***700***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
E ***US Hwy 20***	***Block No.***		***800***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 2	2	0	0	2	2	0	2	0	0	0	0	0	0	0
Wabash Street	***Block No.***		***2500***											
Total Calls for Block: 1	1	0	0	1	0	1	1	0	0	0	0	0	0	0
Wabash Street	***Block No.***		***2800***											
Total Calls for Block: 1	0	1	0	1	0	0	0	0	1	0	0	0	0	0
Total Calls for Street: 2	1	1	0	2	0	1	1	0	1	0	0	0	0	0
Walker Street	***Block No.***		***800***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Wayne Street	***Block No.***		***100***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
White Oak Drive	***Block No.***		***600***											
Total Calls for Block: 1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Windsor Road	***Block No.***		***3500***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0

APPENDIX L

All Streets: Work Order Summary Report

12/1/2007

From: 12/31/2007 To:

Cleaned	Jetted/ Cleaned	Vacuum/ Running	Down and Cut	Line Notified	Party Event	Left Card	Backup	Rain Water	Standing Basin	Cave In	MH	Catch Insp.	Tap Req.	Video
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
N Woodland Avenue	***Block No.***		***100***											
Total Calls for Block: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Total Calls for Street: 1	1	0	0	1	1	0	1	0	0	0	0	0	0	0
Woodrow Avenue	***Block No.***		***3000***											
Total Calls for Block: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Calls for Street: 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Total Calls for Report: 56	39	9	1	43	36	3	38	0	4	2	6	3	0	0

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
10th Street													
700	E	707.0	12/11/2007 12:47 PM	Downs, D Regular Business Hours	3279	12/11/2007 2 :15 PM	22						
		Problem: Standing water											
1100	W	1108.0	12/25/2007 11:30 PM	Bostater, D After Regular Hours	3304	12/25/2007 12:40 AM	22						
		Problem: Backup. Go to back door.											
Total Calls for Street: 2													
11th Street													
300	E	319.0	12/13/2007 7 :35 AM	Downs, D Regular Business Hours	3283	12/13/2007 8 :22 AM	14						
		Problem: Needs a jet out because sewage backing up in basement and washer. Also, would like to know if he could find out how many times this has happened in the past 5 years?											
Total Calls for Street: 1													
8th Street													
1000	W	1005.0	12/17/2007 2 :44 PM	Downs, D Regular Business Hours	3293	12/19/2007 10:36 AM	14						
		Problem:											
Total Calls for Street: 1													
9th Street													

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
300	E	315.0	12/17/2007 9 :35 AM	Downs, D Regular Business Hours	3292	12/17/2007 10:25 AM	04,14						
		Problem:											
300	E	315.0	12/21/2007 10:56 AM	Downs, D Regular Business Hours	3303	12/21/2007 11:26 AM	14						
		Problem:											

Total Calls for Street: 2

Benton Street

600		609.0	12/11/2007 9 :03 AM	Downs, D Regular Business Hours	3275	12/11/2007 9 :39 AM	22						
		Problem:	Has standing water by vehicle in street due to leaves piled up from street dept. Standing water										

Total Calls for Street: 1

Broadway Street

400		418.0	12/30/2007 8 :10 PM	Hines, P After Regular Hours	3384	12/30/2007 3 :00 PM	09						
		Problem:	Road very icey. Called Street Department at 0812pm and left message. Then called Bob Sutherlin. He said to send crew with salt out there.										

Total Calls for Street: 1

Butler Street

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
200		206.0	12/21/2007 7 :00 AM	Regular Business Hours	3382	12/21/2007 7 :33 AM	09						
		Problem: Bob Sutherlin(foreman) sent crew. Inspect manhole for roots and debris.											

Total Calls for Street: 1

Calumet Avenue

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
0		0.0	12/13/2007 7 :00 AM	Sutherlin, B Regular Business Hours	3369	12/13/2007 8 :08 AM	09						
		Problem: Manhole Missing. Foreman sent out crews.											
0		0.0	12/13/2007 7 :15 AM	Sutherlin, B Regular Business Hours	3373	12/13/2007 8 :08 AM	09						
		Problem: Manhole missing.											
100	N	125.0	12/7/2007 1 :50 PM	Collier, M Regular Business Hours	3269	12/7/2007 3 :25 PM	14						
		Problem:											

Total Calls for Street: 3

Carroll Avenue

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
0	N	0.0	12/4/2007 1 :16 PM	Tabisz, T Regular Business Hours	3264	12/4/2007 1 :50 PM	09						
		Problem: CB grate at NW corner of Carroll Ave. and Michigan Blvd. missing some rungs. Rick's Sewer service called. CB grate-broken.											

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
Total Calls for Street: 1												
Cleveland Avenue												
0	0.0	12/14/2007 8 :05 AM	Sutherlin, B Regular Business Hours	3381	12/14/2007 8 :05 AM	09						
	Problem: Big hole by the manhole, heard transmit over radio.											
Total Calls for Street: 1												
Columbia Street												
200	206.0	12/11/2007 12:49 PM	Downs, D Regular Business Hours	3280	12/11/2007 1 :14 PM	14						
	Problem:											
Total Calls for Street: 1												
Decatur Street												
600	607.0	12/26/2007 9 :58 AM	Downs, D Regular Business Hours	3306	12/26/2007 11:35 AM	04,09,14						
	Problem: Standing water in basement.											
Total Calls for Street: 1												
Dunlap Street												

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
100	102.0	12/5/2007 1 :30 PM	Downs, D Regular Business Hours	3266	12/5/2007 2 :00 PM	14						
	Problem:											

Total Calls for Street: 1

Dupage Street

600	609.0	12/26/2007 8 :57 AM	Downs, D Regular Business Hours	3305	12/26/2007 9 :55 AM	14						
	Problem: Standing water in basement.											

Total Calls for Street: 1

Franklin Street

400	411.0	12/19/2007 4 :20 PM	Hines, P After Regular Hours	3296	12/19/2007 5 :48 PM	14						
	Problem:											
400	411.0	12/20/2007 9 :10 AM	Tabisz, T Regular Business Hours	3297	12/20/2007 9 :25 AM	04,06,13,14						
	Problem: Had District crew out last night but still having problem. Contractor says there was a problem with city main last night.											
600	601.0	12/10/2007 1 :17 PM	Downs, D Regular Business Hours	3274	12/10/2007 1 :53 PM	04,09						
	Problem: Missing manhole cover in sidewalk at corner of building on the 6th St. side of street. Apparently a sewer clean out. Missing M.H. cover/											

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
Total Calls for Street: 3												
Hayes Avenue												
400	439.0	12/27/2007 12:18 PM	Downs, D Regular Business Hours	3307	12/27/2007 12:56 PM	14						
	Problem:											
Total Calls for Street: 1												
Holliday Street												
0	0.0	12/13/2007 11:26 AM	Bates, C Regular Business Hours	3286	11/13/2007 12:57 PM	22						
	Problem:	Says there is dirt and debris in a drain. Causing water to stand. CB Plugged										
500	538.0	12/18/2007 11:43 AM	Tabisz, T Regular Business Hours	3295	12/18/2007 1 :03 PM	14						
	Problem:	Needs jet call.										
500	538.0	12/21/2007 9 :04 AM	Downs, D Regular Business Hours	3300	12/21/2007 10:50 AM	13,22						
	Problem:											
Total Calls for Street: 3												
Karwick Road												

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
100	102.0	12/7/2007 8 :00 AM	Downs, D Regular Business Hours	3368	12/7/2007 9 :10 AM	09,13,25						
	Problem: Foreman sent out crews. Possible cave-in.											
100	102.0	12/7/2007 9 :00 AM	Regular Business Hours	3380	12/7/2007 9 :10 AM	09,13,25						
	Problem: Possible cave-in. Bob Sutherlin(foreman) sent crew.											

Total Calls for Street: 2

Maple Street

500	501.0	12/4/2007 11:15 AM	Sanders, D Regular Business Hours	3265	12/4/2007 12:50 PM	14						
	Problem:											

Total Calls for Street: 1

McClelland Avenue

100	103.0	12/28/2007 12:17 PM	Downs, D Regular Business Hours	3309	12/28/2007 2 :10 PM	04,14						
	Problem:											

Total Calls for Street: 1

Michigan Boulevard

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
800	E	826.0	12/13/2007 11:26 AM	Bates, C Regular Business Hours	3285	12/13/2007 12:58 PM	14						
		Problem: Backup in basement.											
800	E	826.0	12/28/2007 10:47 AM	Downs, D Regular Business Hours	3308	12/28/2007 11:38 AM	13,14						
		Problem: Says landlord had rotorooter guy out within last 2 weeks and still having problem with bad smell. Says she checked basement of this bldg. and found standing sewage. Says she spoke with a gentleman here last week or early this week, but no return call. Needs to know what to do. I had crew go out to service line.											

Total Calls for Street: 2

Pearl Street

400		413.0	12/21/2007 9 :50 AM	Collier, M Regular Business Hours	3302	12/21/2007 10:28 AM	14						
		Problem: Continuely having backup.											

Total Calls for Street: 1

Pine Street

700		715.0	12/11/2007 12:30 PM	Bates, C Regular Business Hours	3277	12/11/2007 1 :00 PM	22						
		Problem: Dry-Wells in the alley are like ice skating rinks. Dry well iced up.											

Total Calls for Street: 1

Pleasant Avenue

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #		Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
500		518.0	12/29/2007 11:00 AM	Bostater, D After Regular Hours	3310	12/29/2007 12:05 PM	14						
		Problem:											

Total Calls for Street: 1

Poplar Street

0		0.0	12/11/2007 12:10 PM	Sanders, D Regular Business Hours	3276	12/11/2007 12:23 PM	22						
		Problem:	Plugged CB- Poplar St. and Tremont St. Per Helen from Refuse Dept., Call came to their office. Plugged CB.										

Total Calls for Street: 1

Porter Street

300	N	304.0	12/3/2007 6 :35 AM	Barnett, T After Regular Hours	3263	12/3/2007 7 :32 AM	14						
		Problem:											
400	S	404.0	12/16/2007 11:52 AM	Milatovic, M After Regular Hours	3290	12/15/2007 12:42 PM	06,22						
		Problem:	Jet call										

Total Calls for Street: 2

Ridgeland Avenue

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
500	N	516.0	12/13/2007 9 :25 AM	Downs, D Regular Business Hours	3284	12/13/2007 10:05 AM	14,22						

Problem:

Total Calls for Street: 1

Salem Court

1000		1037.0	12/7/2007 2 :20 PM	Collier, M Regular Business Hours	3270	12/7/2007 3 :04 PM	14						

Problem:

Total Calls for Street: 1

Southwood Drive

200		233.0	12/12/2007 2 :45 PM	Downs, D Regular Business Hours	3282	12/12/2007 3 :00 PM	04						

Problem: Some standing water. Hoffman will assess. Radiod and stated not enough water to worry about. Will check in morning again. 12-13-07 Hoffman checked residence and says there is not enough water to vac. If anything, less water today than yesterday.

Total Calls for Street: 1

Spring Street

1100		1100.0	12/21/2007 8 :00 AM	Regular Business Hours	3383	12/21/2007 8 :05 AM	22						

Problem: Bob Sutherlin(foreman)sent crew.

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
Total Calls for Street: 1												
Springland Avenue												
300	325.0	12/9/2007 8 :50 PM	Barnett, T After Regular Hours	3272	12/9/2007 4 :47 PM	14						
	Problem:											
300	325.0	12/15/2007 7 :12 PM	Dietz, T After Regular Hours	3289	12/15/2007 8 :00 PM	14						
	Problem: Church member of parsonage called. Jet call											
Total Calls for Street: 2												
Tennessee Street												
1300	1302.0	12/21/2007 9 :04 AM	Downs, D Regular Business Hours	3301	12/21/2007 9 :38 AM	14						
	Problem:											
1700	1711.0	12/13/2007 9 :36 PM	Hines, P After Regular Hours	3287	12/13/2007 10:30 PM	14						
	Problem:											
Total Calls for Street: 2												
Union Street												

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
500		515.0	12/12/2007 12:40 PM	Sanders, D Regular Business Hours	3281	12/12/2007 2 :13 PM	14						
		Problem: Says there has been fumes in home since Monday.											

Total Calls for Street: 1

US Hwy 20

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
700	E	756.0	12/29/2007 2 :52 PM	Bostater, D After Regular Hours	3312	12/29/2007 3 :20 PM	14						
		Problem:											
800	E	802.0	12/29/2007 2 :20 PM	Sanders, S After Regular Hours	3311	12/29/2007 3 :20 PM	14						
		Problem:											

Total Calls for Street: 2

Wabash Street

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
2500		2501.0	12/7/2007 1 :05 PM	Collier, M Regular Business Hours	3268	12/7/2007 2 :12 PM	14						
		Problem: Gene's was out 3 weeks ago and pulled back roots at about 75' believing to be in city line. Please check.											
2800		2809.0	12/11/2007 12:40 PM	Downs, D Regular Business Hours	3278	12/11/2007 1 :55 PM	09,22						
		Problem: standing water because of leaves and debris. Standing water.											

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block #	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
Total Calls for Street: 2												
Walker Street												
800	806.0	12/20/2007 5 :17 PM	Richey, J After Regular Hours	3298	12/20/2007 5 :55 PM	14						
	Problem:											
Total Calls for Street: 1												
Wayne Street												
100	106.0	12/14/2007 10:48 AM	Tabisz, T Regular Business Hours	3288	12/14/2007 11:11 AM	14						
	Problem: Says he has been having a problem with his toilet backing up since the Water Dept. shut off water service to neighbor's house at 110 Wayne St,											
Total Calls for Street: 1												
White Oak Drive												
600	632.0	12/31/2007 12:45 PM	Barnett, T After Regular Hours	3313	12/31/2007 1 :55 PM	22						
	Problem: Jet call. 1/3 tile both manhole to manhole.											
Total Calls for Street: 1												
Windsor Road												

All Streets: Work Order Summary Report

From: **To:**12/1/2007 12/31/2007

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
3500		3518.0	12/17/2007 8 :12 AM	Downs, D Regular Business Hours	3291	12/17/2007 8 :44 AM	14						
		Problem:											

Total Calls for Street: 1

Woodland Avenue

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
100	N	126.0	12/20/2007 6 :55 PM	Hines, P After Regular Hours	3299	12/20/2007 7 :57 PM	14						
		Problem:											

Total Calls for Street: 1

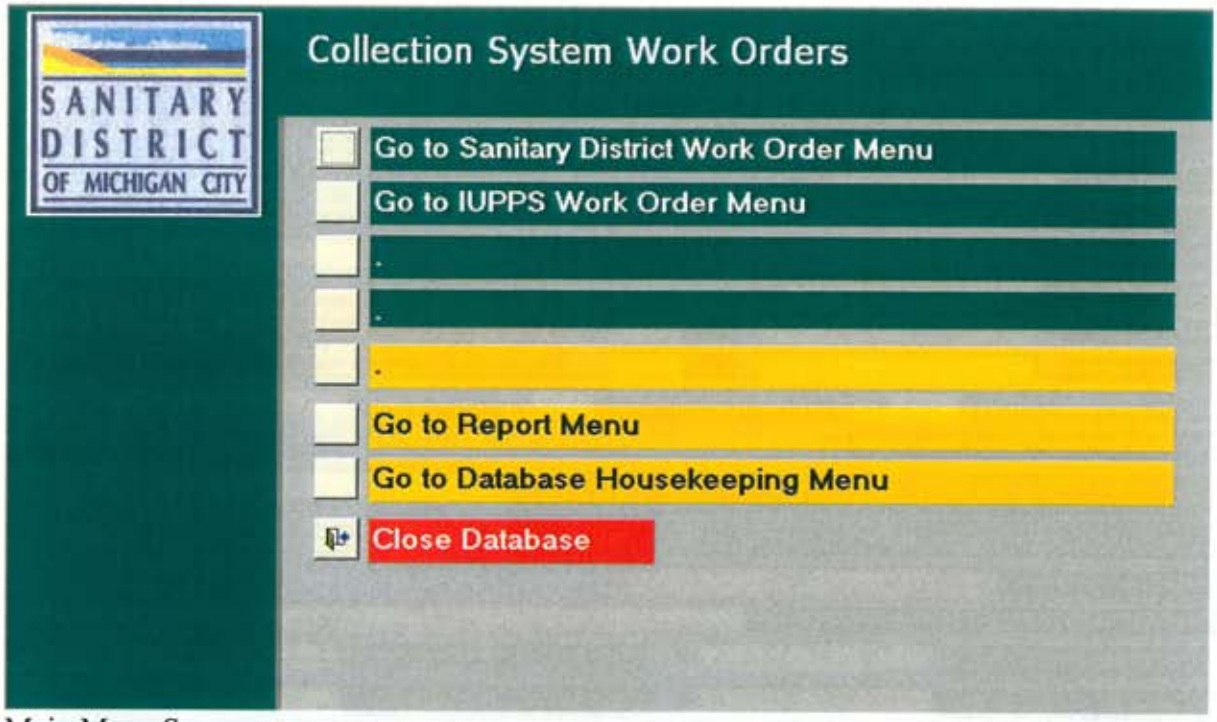
Woodrow Avenue

Block	#	Address - Alley?	Date/ Time	Received by... When...	Work Order No:	Date Resolved TimeResolved	Equipment Used	Jetted/ Cleaned	Vacuum/ Cleaned	Down and Down and Running	Line Line Cut	Party Party Notified	Left Left Card
3000		3027.0	12/14/2007 8 :00 AM	Regular Business Hours	3363	12/14/2007 9 :08 AM	9,13						
		Problem:	Ed Gonzalez found this in historical work orders and sent crew to fix it. Manhole too high-fill around manhole with black top.										

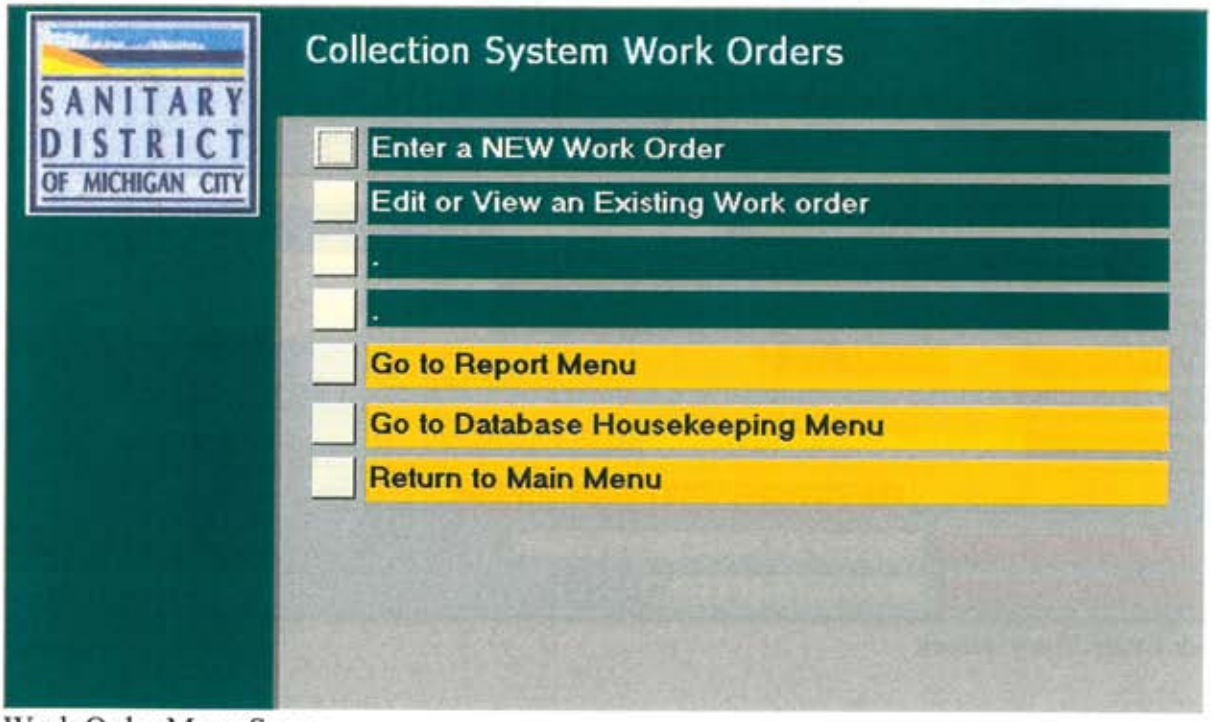
Total Calls for Street: 1

Total Calls for Period: 56

APPENDIX L
Collection System Work Order Database

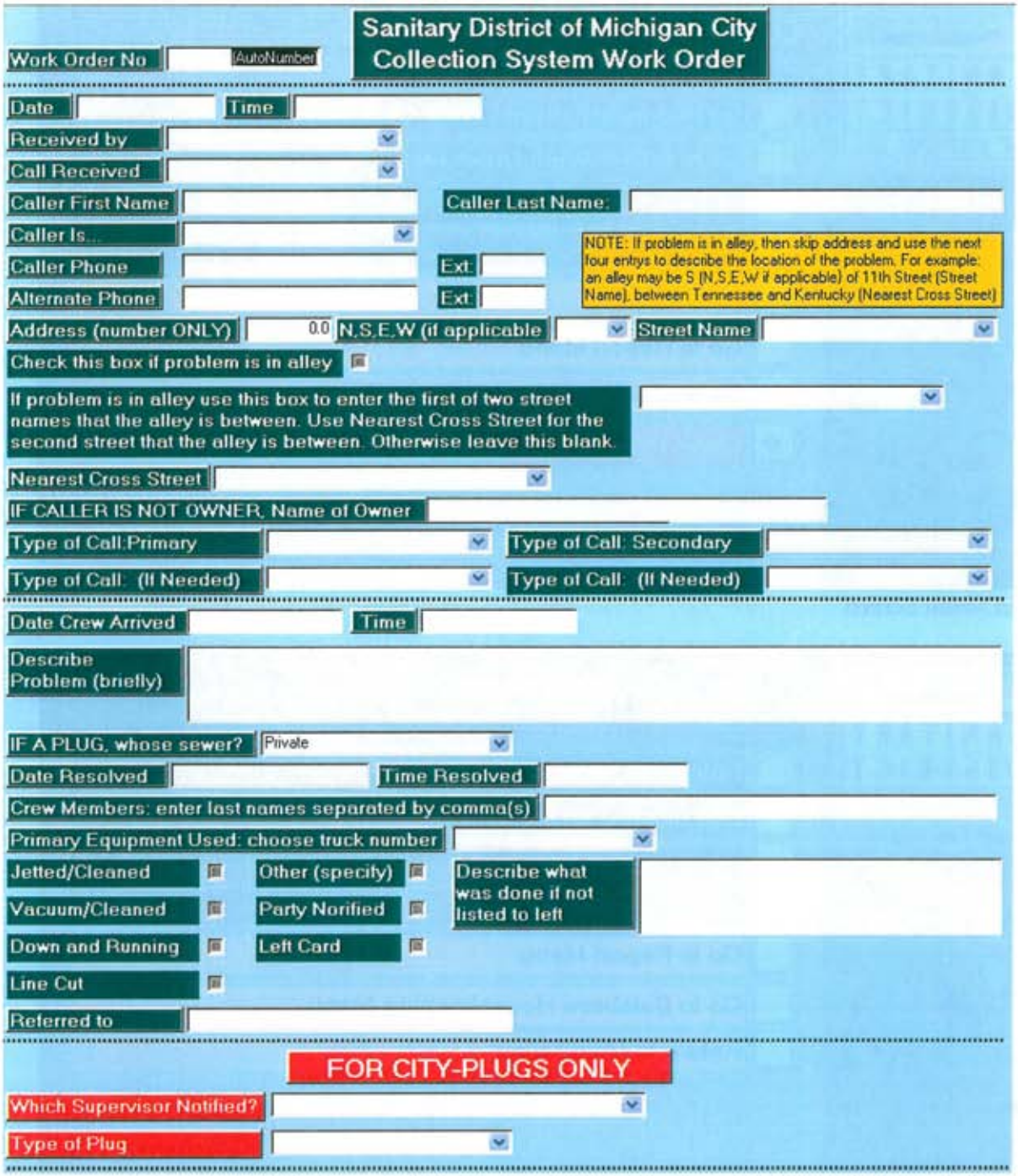


Main Menu Screen



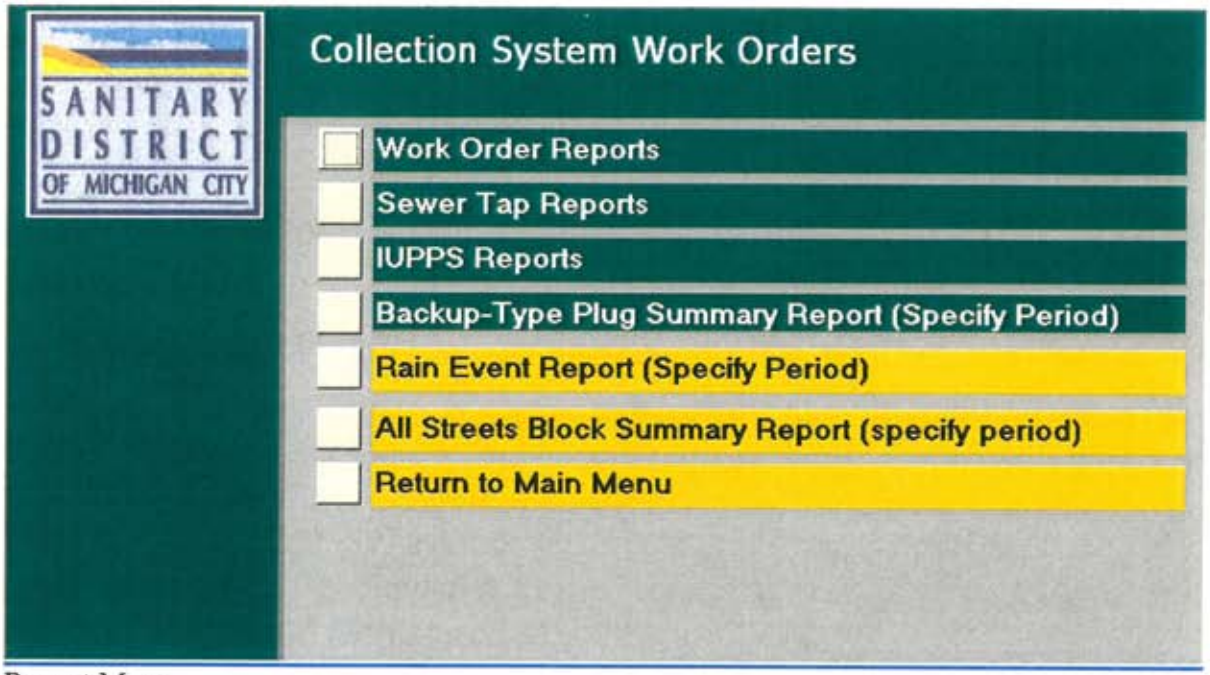
Work Order Menu Screen

APPENDIX L
Collection System Work Order Database

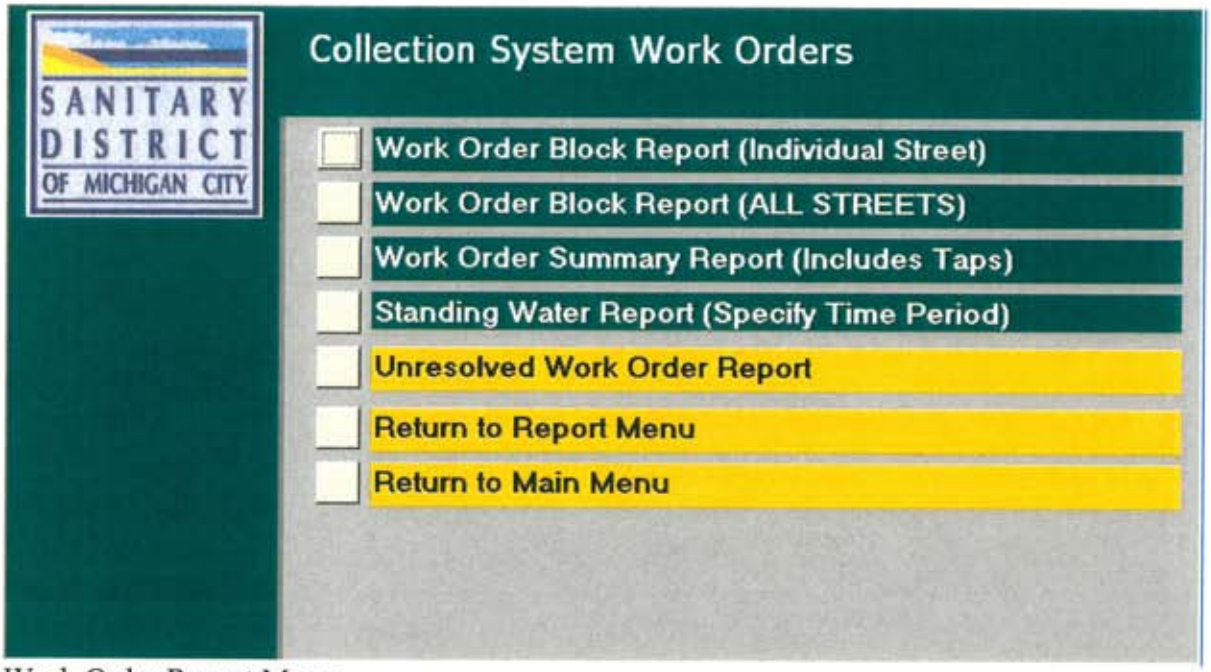


Work Order Entry Screen

APPENDIX L
Collection System Work Order Database



Report Menu



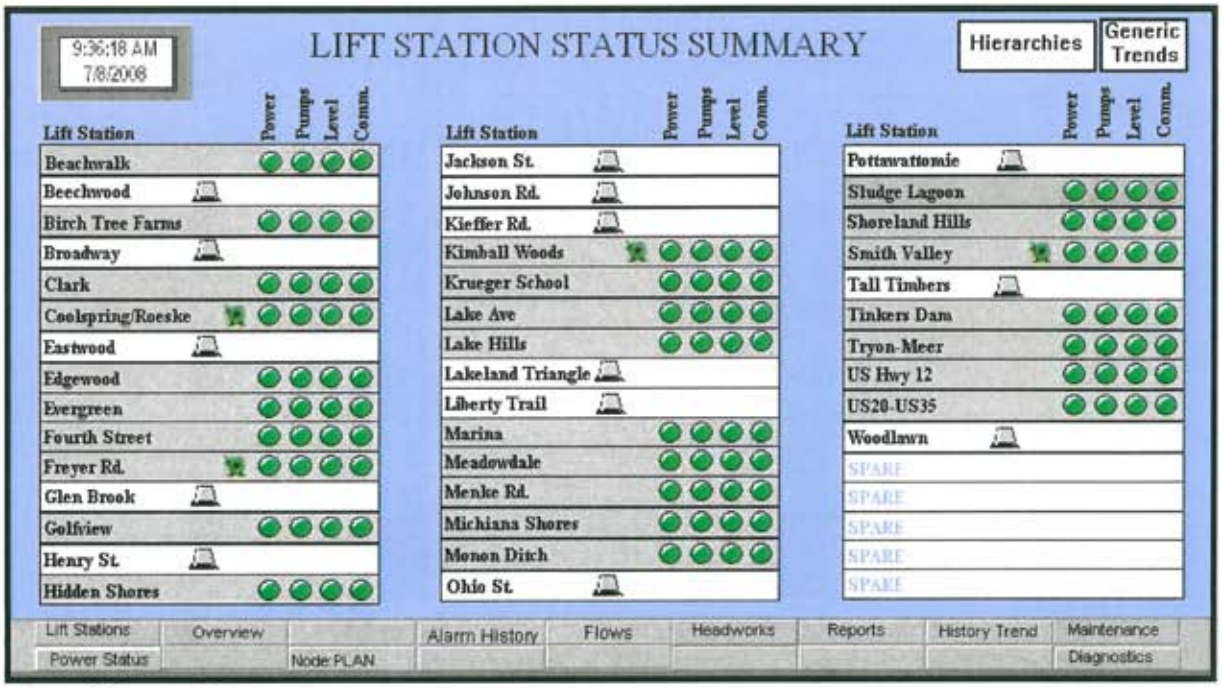
Work Order Report Menu

Examples of ALL STREETS SUMMARY BLOCK SUMMARY REPORT (specify period), Report Menu, and WORK ORDER BLOCK REPORT (ALL STREETS), Work Order Report Menu, follow.

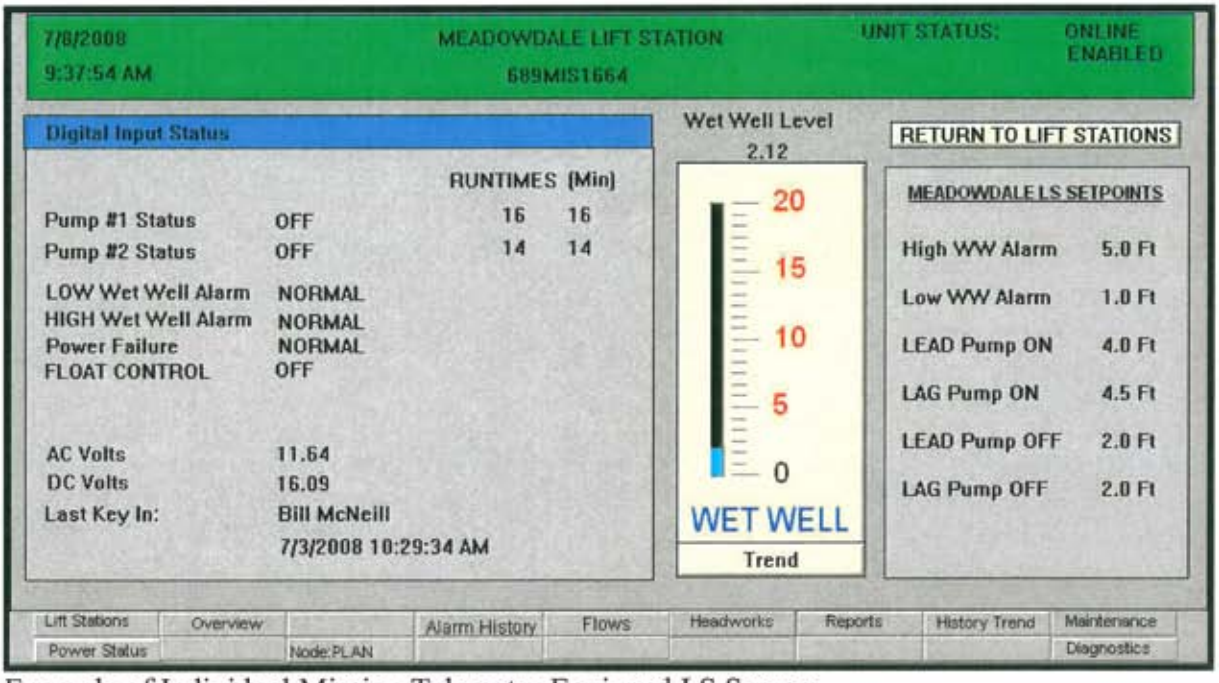
APPENDIX M

Lift Station Alarm Screens from Wonderware SCADA

APPENDIX M
Lift Station Alarm Screens from Wonderware SCADA



Overall Status Screen



Example of Individual Mission Telemetry Equipped LS Screen

APPENDIX N

Wet Weather Events for 2006 through 2008

APPENDIX N

Sanitary District of Michigan City

2006-08 Rain Events with Significant Storm Basin Use

EVENT #	Time Storm Began (24-Hr Clock)	Time Storm Ended (24-Hr Clock)	Duration of Storm (Hr:Min:Sec)	Total Rainfall for Storm (Inches)	Bulletin 71 Storm Rating (Yr Return - Hrs)	Began Filling Basins (24-Hr Clock)	Time Basins Empty (24-Hr Clock)	Time Elapsed from End of Storm to Empty Basins (Hr:Min:Sec)	CSO Event?
2006 Storms									
1	1/20/06 15:15	1/21/06 1:15	10:00:00	0.52	<1 Yr - 1 Hr	1/20/06 12:39	1/22/06 14:44	37:29:00	
2	2/16/06 15:15	2/16/06 18:15	3:00:00	0.33	<1 Yr - 1 Hr	2/16/06 18:00	2/17/06 2:00	7:45:00	
3	3/9/06 1:00	3/9/06 2:15	1:15:00	0.61	<1 Yr - 1 Hr	3/9/06 2:24			
	3/9/06 18:30	3/10/06 0:30	6:00:00	0.62	<1 Yr - 1 Hr		3/10/06 3:00	2:30:00	
4	3/13/06 0:15	3/13/06 3:15	3:00:00	1.32	<1 Yr - 1 Hr	3/13/06 1:31	3/14/06 10:00	30:45:00	
5	4/2/06 20:15	4/2/06 21:00	0:45:00	0.27	<1 Yr - 1 Hr	4/2/06 22:30			
	4/3/06 3:45	4/3/06 7:00	3:15:00	0.22	<1 Yr - 1 Hr		4/3/06 7:30	0:30:00	
6	4/16/06 13:30	4/17/06 1:15	11:45:00	1.35	<1 Yr - 1 Hr	4/16/06 17:58	4/17/06 13:00	11:45:00	
7	5/10/06 21:30	5/11/06 18:00	20:30:00	1.60	<1 Yr - 1 Hr	5/11/06 19:00	5/12/06 2:00	8:00:00	
8	5/24/06 8:30	5/24/06 13:45	5:15:00	0.51	<1 Yr - 1 Hr	5/24/06 15:35			
	5/24/06 22:15	5/24/06 23:00	0:45:00	0.32	<1 Yr - 1 Hr		5/26/06 10:00	44:15:00	
9	6/10/06 2:15	6/10/06 9:30	7:15:00	0.75	<1 Yr - 1 Hr	6/10/06 5:49	6/11/06 10:05	24:35:00	
10	6/21/06 16:30	6/21/06 17:00	0:30:00	0.44	<1 Yr - 1 Hr	6/21/06 6:18	6/21/06 22:58	5:58:00	
11	6/27/06 19:30	6/27/06 20:45	1:15:00	0.50	<1 Yr - 1 Hr	6/27/06 21:40	6/28/06 5:00	8:15:00	
12	7/11/06 4:45	7/11/06 14:45	10:00:00	0.73	<1 Yr - 1 Hr	7/11/06 12:56	7/11/06 22:36	7:51:00	
13	7/14/06 5:15	7/14/06 13:30	8:15:00	1.30	<1 Yr - 1 Hr	7/14/06 7:50	7/15/06 23:35	34:05:00	
14	7/18/06 0:45	7/18/06 1:45	1:00:00	0.68	2 Yr - 30 Min	7/18/06 1:40	7/18/06 16:10	14:25:00	
15	7/20/06 5:15	7/20/06 10:00	4:45:00	0.67	<1 Yr - 1 Hr	7/20/06 7:00	7/21/06 14:15	28:15:00	
16	**7/27/06 16:15**	**7/27/06 20:15**	**4:00:00**	**2.84**	**10 Yr - 3 Hr**	**7/27/06 17:42**	**7/31/06 4:45**	**80:30:00**	**Yes**
17	8/2/06 21:45	8/3/06 1:15	3:30:00	1.01	<1 Yr - 1 Hr	8/2/06 0:00			
	8/3/06 5:45	8/3/06 11:45	6:00:00	0.52	<1 Yr - 1 Hr		8/4/06 20:15	32:30:00	
18	8/18/06 23:00	8/19/06 3:15	4:15:00	1.60	<1 Yr - 1 Hr	8/19/06 0:30	8/20/06 5:00	25:45:00	
19	8/23/06 18:00	8/24/06 20:30	26:30:00	2.40	10 Yr - 2 Hr	8/23/06 18:00	8/26/06 12:00	39:30:00	
20	8/28/06 11:00	8/28/06 16:45	5:45:00	1.19	<1 Yr - 1 Hr	8/28/06 11:50	8/30/06 9:40	40:55:00	
21	**9/12/06 20:00**	**9/12/06 22:00**	**2:00:00**	**1.29**	**1 Yr - 1 Hr**	**9/12/06 21:02**			
	9/13/06 7:00	**9/13/06 9:00**	**2:00:00**	**1.87**	**2 yr - 2 Hr**		**9/19/06 4:30**	**139:30:00**	**Yes**
22	9/23/06 18:30	9/23/06 20:00	1:30:00	0.28	<1 Yr - 1 Hr	9/23/06 19:39	9/24/06 3:02	7:02:00	
23	9/28/06 4:00	9/28/06 14:30	10:30:00	0.77	<1 Yr - 1 Hr	9/28/06 9:58	9/29/06 18:01	27:31:00	
24	10/2/06 22:15	10/3/06 1:45	3:30:00	1.02	<1 Yr - 1 Hr	10/2/06 16:15	10/5/06 15:09	61:24:00	
25	10/16/06 15:45	10/17/06 4:45	13:00:00	0.96	<1 Yr - 1 Hr	10/17/06 0:00	10/17/06 20:58	16:13:00	
26	11/10/06 17:40	11/10/06 21:20	3:40:00	0.53	<1 Yr - 1 Hr	11/10/06 20:19	11/11/06 4:15	6:55:00	
27	11/29/06 21:55	11/30/06 1:35	3:40:00	0.58	<1 Yr - 1 Hr	11/29/06 16:12	12/3/06 22:13	92:38:00	
28	12/22/06 5:10	12/22/06 10:10	5:00:00	0.69	<1 Yr - 1 Hr	12/22/06 6:58	12/23/06 14:41	28:31:00	

Data Compiled and Storm Evaluated by Daniel R. Olson, Plant Superintendent

APPENDIX N

Sanitary District of Michigan City

2006-08 Rain Events with Significant Storm Basin Use

EVENT #	Time Storm Began (24-Hr Clock)	Time Storm Ended (24-Hr Clock)	Duration of Storm (Hr:Min:Sec)	Total Rainfall for Storm (Inches)	Bulletin 71 Storm Rating (Yr Return - Hrs)	Began Filling Basins (24-Hr Clock)	Time Basins Empty (24-Hr Clock)	Time Elapsed from End of Storm to Empty Basins (Hr:Min:Sec)	CSO Event?
2007 Storms									
1	1/4/07 14:30	1/4/07 22:05	7:35:00	1.35	<1 Yr - 1 Hr	1/4/07 17:16	1/7/07 7:16	**57:11:00**	
2	1/14/07 4:25	1/14/07 6:35	2:10:00	0.47	<1 Yr - 1 Hr	1/14/07 22:19			
	1/14/07 19:30	1/15/07 3:05	7:35:00	0.19	<1 Yr - 1 Hr		1/16/07 1:40	22:35:00	
3	2/24/07 19:00	2/25/07 3:25	8:25:00	0.47	<1 Yr - 1 Hr	2/25/07 11:02			
	2/25/07 9:00	2/25/07 14:50	5:50:00	0.40	<1 Yr - 1 Hr		2/26/07 11:07	20:17:00	
4	3/19/07 3:00	3/19/07 4:55	1:55:00	0.27	<1 Yr - 1 Hr	3/19/07 5:18	3/19/07 6:07	1:12:00	
5	3/21/07 3:05	3/21/07 5:45	2:40:00	0.29	<1 Yr - 1 Hr	3/21/07 5:21	3/21/07 10:09	4:24:00	
6	3/22/07 4:15	3/22/07 9:15	5:00:00	0.38	<1 Yr - 1 Hr	3/22/07 6:16	3/22/07 18:15	9:00:00	
7	4/11/07 2:25	4/11/07 14:30	12:05:00	0.56	<1 Yr - 1 Hr	4/11/07 11:11	4/11/07 22:32	8:02:00	
8	**4/25/07 0:10**	**4/25/07 8:05**	**7:55:00**	**2.46**	**1 Yr - 1 Hr**	**4/25/07 3:25**			
	4/26/07 15:25	**4/26/07 17:25**	**2:00:00**	**1.17**	**<1 Yr - 1 Hr**		**5/3/07 1:59**	**152:34:00**	**Yes**
9	5/25/07 0:00	5/25/07 4:30	4:30:00	0.40	<1 Yr - 1 Hr	5/25/07 2:38	5/25/07 5:49	1:19:00	
10	5/26/07 17:30	5/26/07 18:30	1:00:00	0.45	<1 Yr - 1 Hr	5/26/07 18:26	5/27/07 4:24	9:54:00	
11	6/19/07 3:45	6/19/07 5:30	1:45:00	0.90	<1 Yr - 1 Hr	6/19/07 4:59	6/19/07 17:42	12:12:00	
12	7/18/07 19:45	7/19/07 1:45	6:00:00	1.93	2 Yr -1 Hr	7/18/07 21:24			
	7/19/07 4:45	7/19/07 6:45	2:00:00	0.65	<1 Yr - 1 Hr		7/20/07 20:03	37:18:00	
13	7/25/07 14:30	7/25/07 19:00	4:30:00	0.26	<1 Yr - 1 Hr				
	7/25/07 23:45	7/26/07 5:30	5:45:00	2.23	5 Yr - 1 Hr	7/26/07 0:45	7/27/07 22:59	41:29:00	
14	8/5/07 0:15	8/5/07 9:45	9:30:00	1.27	25 Yr -1 Hr	8/5/07 2:51	8/5/07 18:25	8:40:00	
15	8/6/07 20:15	8/6/07 21:15	1:00:00	0.19	<1 Yr - 1 Hr	8/6/07 21:34	8/7/07 2:05	4:50:00	
16	8/7/07 2:00	8/7/07 6:45	4:45:00	0.37	<1 Yr - 1 Hr	8/7/07 5:50	8/7/07 7:54	1:09:00	
17	8/9/07 4:15	8/9/07 6:15	2:00:00	0.33	<1 Yr - 1 Hr	8/9/07 5:58	8/9/07 11:28	5:13:00	
18	8/15/07 20:30	8/15/07 21:15	0:45:00	0.62	<1 Yr - 1 Hr	8/15/07 21:14	8/16/07 11:42	14:27:00	
19	8/20/07 0:15	8/20/07 6:30	6:15:00	0.70	<1 Yr - 1 Hr	8/20/07 3:44	8/20/07 20:26	13:56:00	
20	**8/22/07 23:00**	**8/23/07 1:45**	**2:45:00**	**0.54**	**<1 Yr - 1 Hr**				
	8/23/07 16:00	**8/23/07 23:00**	**7:00:00**	**1.66**	**<1 Yr - 1 Hr**	**8/23/07 0:20**			
	8/24/07 0:45	**8/24/07 4:30**	**3:45:00**	**0.22**	**<1 Yr - 1 Hr**				
	8/25/07 5:30	**8/25/07 9:30**	**4:00:00**	**0.55**	**<1 Yr - 1 Hr**		**8/29/07 19:38**	**106:08:00**	**Yes**
21	9/25/07 19:45	9/25/07 20:15	0:30:00	0.46	<1 Yr - 1 Hr	9/25/07 20:36			
	9/25/07 23:30	9/26/07 4:45	5:15:00	0.20	<1 Yr - 1 Hr		9/26/07 6:45	2:00:00	

Data Compiled and Storm Evaluated by Daniel R. Olson, Plant Superintendent

APPENDIX N

Sanitary District of Michigan City

2006-08 Rain Events with Significant Storm Basin Use

EVENT #	Time Storm Began (24-Hr Clock)	Time Storm Ended (24-Hr Clock)	Duration of Storm (Hr:Min:Sec)	Total Rainfall for Storm (Inches)	Bulletin 71 Storm Rating (Yr Return - Hrs)	Began Filling Basins (24-Hr Clock)	Time Basins Empty (24-Hr Clock)	Time Elapsed from End of Storm to Empty Basins (Hr:Min:Sec)	CSO Event?
2008 Storms									
1	**1/7/08 18:30**	**1/7/08 21:15**	**2:45:00**	**1.09**	**<1 Yr - 1 Hr**	**1/7/08 19:17**			
	1/7/08 22:00	**1/8/08 10:00**	**12:00:00**	**1.68**	**12Hr - 2 Yr**				
	1/10/08 16:15	**1/10/08 20:00**	**3:45:00**	**0.61**	**<1 Yr - 1 Hr**		**1/15/08 2:27**	**102:27:00**	**Yes**
2	1/29/08 16:00	1/29/08 19:00	3:00:00	0.37	<1 Yr - 1 Hr	1/29/08 17:14	1/30/08 5:17	10:17:00	
3	2/5/08 15:30	2/5/08 21:30	6:00:00	0.33	<1 Yr - 1 Hr	2/5/08 19:14			
	2/6/08 0:00	2/6/08 17:45	17:45:00	0.36	<1 Yr - 1 Hr		2/8/08 3:38	33:53:00	
4	2/17/08 4:00	2/17/08 17:00	13:00:00	0.46	<1 Yr - 1 Hr	2/17/08 6:34	2/18/08 4:28	11:28:00	
5	3/3/08 6:15	3/3/08 10:45	4:30:00	0.42	<1 Yr - 1 Hr	3/3/08 19:27	3/4/08 17:06	30:21:00	
6	3/31/08 12:30	3/31/08 17:00	4:30:00	0.48	<1 Yr - 1 Hr	3/31/08 13:26	4/1/08 2:53	9:53:00	
7	4/8/08 18:45	4/8/08 23:30	4:45:00	0.55	<1 Yr - 1 Hr	4/8/08 20:19	4/9/08 8:09	8:39:00	
8	4/10/08 11:30	4/10/08 15:30	4:00:00	0.63	<1 Yr - 1 Hr	4/10/08 13:32	4/10/08 18:06	2:36:00	
9	4/10/08 19:00	4/10/08 22:45	3:45:00	0.08	<1 Yr - 1 Hr	4/10/08 19:53	4/11/08 10:20	11:35:00	
10	4/28/08 14:15	4/28/08 21:45	7:30:00	0.43	<1 Yr - 1 Hr	4/28/08 4:36	4/28/08 23:17	1:32:00	
11	5/2/08 8:30	5/2/08 21:30	13:00:00	0.73	<1 Yr - 1 Hr	5/2/08 20:50	5/3/08 14:59	17:29:00	
12	5/7/08 8:00	5/7/08 13:15	5:15:00	0.51	<1 Yr - 1 Hr	5/7/08 11:31	5/7/08 23:03	9:48:00	
13	5/11/08 6:15	5/11/08 15:48	9:33:00	0.52	<1 Yr - 1 Hr	5/11/08 9:22	5/12/08 0:53	9:05:00	
14	5/17/08 11:34	5/18/08 1:32	13:58:00	0.40	<1 Yr - 1 Hr	5/17/08 10:19	5/18/08 5:13	3:41:00	
15	6/6/08 14:00	6/6/08 14:30	0:30:00	0.34	<1 Yr - 1 Hr	6/6/08 14:59	6/6/08 14:58	0:28:00	
16	6/8/08 13:45	6/8/08 15:00	1:15:00	0.76	<1 Yr - 1 Hr	6/8/08 14:37	6/9/08 9:37	18:37:00	
17	8/4/08 20:45	8/4/08 21:15	0:30:00	0.63	<1 Yr - 1 Hr	8/4/08 21:27	8/5/08 10:29	13:14:00	
18	9/4/08 6:12	9/5/08 1:00	18:48:00	2.68	<1 Yr - 1 Hr	9/4/08 6:12	9/6/08 6:06	29:06:00	
19	9/8/08 12:45	9/9/08 0:45	12:00:00	1.18	<1 Yr - 1 Hr	9/8/08 14:07	9/9/08 9:15	8:30:00	
20	**9/12/08 20:15**	**9/13/08 9:15**	**13:00:00**	**5.76**		**9/13/08 4:06**			
	9/13/08 15:15	**9/14/08 16:30**	**25:15:00**	**3.30**	**>100 Yr - 72 Hr**		**9/29/08 6:01**	**349:31:00**	**Yes**
21	10/7/08 16:00	10/7/08 23:15	7:15:00	1.26	<1 Yr - 1 Hr	10/7/08 19:27	10/10/08 1:48	50:33:00	
22	12/9/08 5:15	12/9/08 12:00	6:45:00	0.69	<1 Yr - 1 Hr	12/9/08 7:42	12/10/08 1:12	13:12:00	
23	**12/26/08 3:45**	**12/26/08 4:45**	**1:00:00**	**0.06**	**<1 Yr - 1 Hr**	**12/26/08 23:45**			
	12/27/08 6:30	**12/27/08 21:15**	**14:45:00**	**0.94**	**<1 Yr - 1 Hr**		**1/2/09 15:13**	**137:58:00**	**Yes**

Data Compiled and Storm Evaluated by Daniel R. Olson, Plant Superintendent

APPENDIX O

CSO BASIN (Outfall 002A) Discharge Data from 2000 through 2008

APPENDIX O
Sanitary District of Michigan City
CSO Events 2000 through 2008

CSO Events January 2000 through December 2005

CSO EVENT No.	Date	Rainfall or Precip. Inches	Flow to WWTP MGD	Peak Influent Flow MGD	CSO Discharge from 002 (Basin) MGD	Time Overflow Started	Time Overflow Ended		Basin Outfall 002 pH Std Units	Basin Outfall 002 TSS mg/l	Basin Outfall 002 CBOD mg/l	Basin Outfall 002 Total Phosphorus mg/l	Basin Outfall 002 Ammonia-Nitrogen mg/l		Basin Outfall 002 E. coli mg/l
1	10/14/2001	0.50	11.84	13.28	0.03	10:05 PM			7.7	6	24	0.90	4.9		
	10/15/2001	0.06	12.83	14.52	0.05	On going	3:00 AM								
2	05/12/02	1.35	13.48	14.10	2.94	7:45 AM			7.6	32	22	0.70	3.2		TNTC
	05/13/02		13.51	14.41	2.30	On going			7.5	28	19	0.65	4.2		304,000
	05/14/02		13.46	14.45	2.00	On going			7.6	10	13	0.45	4.8		147,000
	05/15/02		13.50	14.30	0.33		4:00 AM		7.8	3	10	0.40	5.0		276,000
3	05/16/02	0.51	13.47	14.27	0.67	4:00 PM				13	12	1.20	5.4		
	05/17/02		13.44	14.19	0.17	On going	2:00 AM		7.8						11,000
4	01/13/05	0.86	13.17	16.54	0.50	1:50 PM									
	01/14/05		13.43	15.61	0.41	On going									
	01/15/05		13.51	15.71	0.16	On going	9:00 AM								

CSO Events January 2006 through December 31, 2008

CSO EVENT No.	Date	Rainfall or Precip. Inches	Flow to WWTP MGD	Peak Influent Flow MGD	CSO Discharge from 002A (Basin) MGD	CSO Discharge		Basin Outfall 002 DO mg/l	Basin Outfall 002 pH Std Units	Basin Outfall 002 TSS mg/l	Basin Outfall 002 CBOD mg/l	Basin Outfall 002 Total Phosphorus mg/l	Basin Outfall 002 Ammonia-Nitrogen mg/l	Basin Outfall 002 Cl2 Res. mg/l	Basin Outfall 002 Cl2 Res. Lb/day	Basin Outfall 002 E. coli Col/100 mls
						Time Discharge Started	Time Discharge Ended									
1	07/27/06	2.84	10.14	35.00	4.50	8:55 PM			6.5	108	39	1.10	2.04	0.02	0.75	780
	07/28/06		15.24	26.97	0.67	On going	8:09 AM	10.9	5.4	4	17	0.80	1.39	0.07	0.39	
2	09/13/06	1.87	15.70	40.00	3.68	1:02 PM		8.9	6.7	53	28.5	0.85	3.21	0.02	0.61	32,400
	09/14/06		13.79	26.62	2.04	On going		5.6	5.1	12	12	0.37	1.20	0.02	0.34	4,950
	09/15/06		10.06	17.90	0.58	On going	4:30 AM									
3	04/25/07	2.46	17.79	>40.00	2.48	5:37 PM								0.04	0.83	
	04/26/07	1.17	17.34	>40.00	1.82	On going		11.2	6.6	17	54	0.40	1.86	0.02	0.30	100
	04/27/07	0.04	16.52	30.02	0.49	On going								1.49	6.09	
	04/28/07		15.39	29.35	0.34	On going	9:30 PM							0.21	0.60	
4	08/25/07	0.55	17.31	30.70	0.63	4:35 PM		10.8	7.5	149	12.8	1.20	2.56	0.02	0.11	31,000
	08/26/07		15.52	15.82	0.25	On going	6:00 AM									
5	1/8/2008	1.68	23.74	45.50	1.00	7:45 AM		10.4	7.6	46	25	0.88	4.00	0.02	0.17	456
	1/9/2008		17.29	29.16	0.28	On going		13.1	7.6	12	12	0.58	3.87	0.02	0.05	TNTC
	1/10/2008	0.61	17.90	44.55	0.02	On going	4:00 AM	8.6	7.4	12	8	0.46	5.18	0.02	0.00	No Disinfection
6	1/10/2008	0.61	17.90	44.55	0.44	11:00 AM										
	1/11/2008	0.01	16.34	26.34	0.05	On going	8:00 AM	7.4	7.8	6	11	0.42	5.68	0.02	0.08	No Disinfection
7	9/13/2008	5.54	18.20	46.25	4.26	6:50 AM		11.1	7.3	42.0	14.0	0.55	1.90	0.02	0.71	1,130
	9/14/2008	3.30	27.28	31.90	12.80	On going		12.0	7.4	33.0	7.2	0.42	1.77	0.03	3.20	26,200
	9/15/2008	0.03	26.90	29.83	6.56	On going		12.9	7.5	26.0	8.3	0.41	1.46	0.14	7.66	1,440
	9/16/2008		26.05	44.48	3.63	On going		14.2	7.4	20.0	28.0	0.34	1.84	0.02	0.61	1,735
	9/17/2008		22.27	25.38	2.84	On going		8.0	7.6	15.0	13.0	0.57	2.65	0.02	0.47	445
	9/18/2008		20.36	24.86	1.77	On going		14.1	7.9	28.0	24.9	0.66	3.90	0.02	0.29	1,760
	9/19/2008		18.27	30.30	0.96	On going		13.5	7.8	1.8	10.2	0.54	3.82	0.04	0.32	120
	9/20/2008		17.78	25.23	0.79	On going		7.3	7.6	12.0	38.9	0.64	5.30	0.02	0.13	14
	9/21/2008		16.05	29.79	0.38	On going		7.0	7.6	10.0	18.3	0.55	3.83	3.94	12.59	2
	9/22/2008		16.15	24.73	0.40	On going		5.2	7.2	5.0	19.0	0.64	4.79	0.02	0.07	184
	9/23/2008		16.02	29.55	0.01	On going	2:00 AM									
8	12/27/2008	0.94	19.92	43.21	0.07	12:00 AM	5:00 AM	11.7	7.5	48.0	31.0	1.20	4.80	No Disinfection		

Compiled by Daniel R. Olson, Plant Superintedent

Updated: 11/24/08